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Numerically Aided Phenomenology: A Demonstration

by

© Donald Peter Schopflocher

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
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ABSTRACT

This research sought to develop concepts about the subjective experience of individuals that would reflect the complexity of this experience by replacing the definition of such concepts in terms of necessary and sufficient conditions with polytypic definitions which rely upon the frequency of occurrence of a variety of symptomatic variables. While the method utilizes measurement procedures that are incompletely specified, it provides a rigorous concept formation strategy that allows its use in similar investigations.

The methodology was demonstrated in an experiment in which 26 subjects reported their ongoing experience of a painting presented for four minutes. Analysis of their reports occurred in four stages:

a. constituents were derived that expressed experiences shared by the individuals,
b. numerical variables were formed from these constituents,
c. clusters were derived of the individuals using the methods of cluster analysis, and
d. interpretations of the resulting clusters were expressed in terms of the constituents shared by cluster members.

In a second experiment, constituents from the first experiment were included in a questionnaire which was administered to 110 students after they had viewed the same

painting for four minutes. Cluster analysis of these data proved insufficient for measuring the concepts of the first experiment.

Yet the concepts from the first experiment were unexpected and meaningful and deserve further investigation. Further research options do exist for their examination and a number of these are discussed. As well, additional techniques for the development of polytypic concepts exist and, in particular, the derivation of overlapping clusters of constituents is considered.

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I. INTRODUCTION

> Even those committed to the acknowledgement of experiential events and to the use of experiential variables in their systematic work tend... to avoid discussion of the many methodico-creative problems that must be joined for effective development of a psychology that takes experience seriously. The paucity of direct considerations of such issues... is in a way astounding... There are, after all, open and important questions having to do with the relations between experience and "report", optimal techniques for experiential observation, prospects for methods of observer training..., the formulation of adequate independent and dependent (experiential) variable categories, optimal modes for integrating behavioral and experiential data, and many others. These are no simple problems; they are not "methodological" in the idle, role-playing sense: the fate of psychology must be very much bound up with progress toward their resolution. (Koch, 1964, p.35)

Humanistic and phenomenological psychologists (e.g., Maslow, 1968; Giorgi, 1970) have argued that traditional modes of inquiry in psychology do not and cannot address psychology's most central questions, those affecting the nature of man's subjective experiences. On the other hand, experimental psychologists (e.g., Rychlak, 1977) characterize humanistic psychology's methodologies as lacking rigor and thus as unsuitable as a basis for scientific advancement. Instead they trust technological developments in methodology to facilitate the progress of psychology as a science. The persistance of these contrasting positions underscores the continuing validity of the assessment offered by Koch almost 20 years ago.

This thesis will develop and demonstrate a mode of inquiry that attempts to further the goals of humanistic psychology while retaining the rigor characteristic of the methods of the experimental psychologist. Thus, qualities of subjective experience will be assessed using individuals' unconstrained verbal reports of their experience, but the method will be specified in precise terms that will allow and encourage replication by other researchers. The successful application of this method will generate precisely defined experiential variables and begin the development of taxonomies of such variables.

The development of the rationale for this mode of inquiry will begin with a discussion of *methodology* which differentiates three processes: *measurement*, *analysis*, and *interpretation*. This will be followed by a discussion of a feature of the process of interpretation and, in particular, concept formation, that seems unrecognised by humanisitic and experimental psychologists alike. Next, current methodologies in traditional and phenomenological psychology will be examined in light of this discussion, and their weaknesses noted. Finally, a form of research will be proposed and demonstrated that attempts to surmount these problems.

A. THE NATURE OF METHODOLOGY

For the purposes of this thesis, a *methodology* will be considered to include three processes: *measurement*, *analysis*, and *interpretation*.[1]

The first process, *measurement*, will be defined as a *procedure by which observations are related to abstract symbols*. All science begins with observation, but two features of the measurement process need to be understood. First, the correspondence between abstract symbols and observations is not governed by completely explicable rules. The rules for relating a numeric value (for example, grams) to the weight of an object are perhaps more explicit than are the rules by which a skilled judge assigns a value indicating the presence of a certain emotional or experiential property (for example, depression) to a self-referential statement, but neither measurement process is completely rule-bound (Polanyi, 1958). Second, the correspondence between an abstract symbol and its related observations cannot be totally detached from the observer's understanding of the meaning of the abstract symbol since that correspondence is constrained by the observer's understanding of the conventions of the language in which it is expressed. For example, the meaning of the term 'gram' or 'depression' must be understood by the observer in order to effect reliable measurement over a broad range of situations.

An independent feature of relative rule explicability is that it facilitates reliability in the specification of the relationship between symbols and observations. It should not be assumed, however, that reliability is possible *only* with relatively explicable symbol-observation correspondence rules. For example, the language users who understand depression may quite reliably judge the presence of depression in a self-referential statement, despite the lack of completely explicable rules for such sentence comprehension. The present conception of measurement, then, emphasizes reliability rather than explicability as a primary goal of measurement.

A second component of methodology, *analysis*, will be defined as *a sequence of transformations applied to symbols to display the structure of their relations*. A technique of analysis has an internal structure; it consists of a set of operations which map elements from a domain of symbols to a range of symbols and it specifies an order in which these operations are applied. For example, the process of summing a column of numbers has as both its domain and range the set of all numbers. The process transforms the column to a single number by a set of rules that are applied in a particular order. The domain of an analysis is the set of symbols resulting from a process of measurement. Typically, because the user of an analytic technique seeks to make inferences based upon his sample of observations that are applicable to the full population of possible observations, the range of the methodology is a set of symbols which correspond to parameters in a model of the structure of the symbol set (and thus ultimately the observations underlying that set). For example, linear regression between two measures assumes a model in which the domain and range are numbers, the meaning of the intervals between the permissable values in each measure's set of numbers is constant, and these values are related such that a constant increase in one measure leads to a constant average increase in the other. The resulting coefficients are parameters of a model that attempts to specify the structure of all possible measurements of the same type. The interpretation of parameters in terms that relate to the original meaning assigned to measurements is the purpose for the application of the analytic technique. This interpretation can be expressed either in terms of new concepts that have arisen during the course of analysis, or as refutations or confirmations of the concepts which underlay the original measurement process.

This definition of analysis implies a number of important properties. First, just as explicability of measurements facilitates reliability, the more complete the specification of the internal structure of a technique of analysis (the sequence of transformations as well as the range and domain of application), the greater will be the potential for replicability of particular inquiries across changes in the measurements on which the analysis is based (such as changes in researcher or sample). The specification of an analytic technique is, after measurement, another locus for potential precision in scientific practise. Second, an analytic technique is insensitive to the meaning ascribed to the symbols to which it is applied. The derivation of observations, their expression in terms of symbols allowable by the technique, and the interpretation of resulting structures of symbols is the responsibility of the individual researcher. In principle the same technique can be applied to a wide variety of observations provided that these observations can be appropriately translated into the technique's domain of application. Third, the line of demarcation between measurement and analysis is difficult to draw. For if it is the case that the procedures of measurement are sufficiently formalized, they can be considered to be a technique of analysis operating on observations to transform them into symbols appropriate for input into another analytic technique. Nevertheless, there is a demarcation because the meaning that the observer intends for his observations is not fully specified by any set of formal measurement procedures, whereas complete explication of analytic strategies is a realizable goal.

Interpretation will be defined here as *a procedure by which the symbols resulting from analysis are invested with meaning*. Because techniques of analysis typically reduce the structure of the symbol set to which they are applied, the parameters that result are removed from this symbol set by an order of abstraction. The interpretation of these parameters will require the individual researcher to invest meaning into them, and this meaning will be related to the meaning that the individual intended for the original symbol set. Thus, if two measures that the researcher employed showed a strong relationship, the interpretation of this finding might result in the formation of a concept which subsumes both measures as components in it. For example, if

a. the number of times a person speaks to a stranger represents gregariousness,

b. the number of times this person engages in sports activities rather than reading represents interest in group activities, and

c. the two are correlated,

then a concept such as extroversion may be inferred that has as components both gregariousness and interest in group activities. (It is this form of interpretation, which we will call concept formation, that is of particular interest in the present study.)

However, the formal structure of the technique of analysis used and the formal structure of the concepts applied to the parameters that result from application of this technique are mutually constrained. That is, the structure of the technique specifies the logical form of the relevant meaningful statements that can be offered about the parameters. To continue the previous example, an account of the concept of extroversion would be constained to interpret the relationship between gregariousness and interest in group activities as linear, such that increases in the measured level of one implies increases in the level of the other and, therefore, in the level of extroversion. The chosen analytic technique would not allow development of the concept of extroversion in terms of differential levels of gregariousness or group activity interest (although another analytic technique might have allowed this development).

This property highlights the relationships between interpretation and other aspects of method in the practise of science. On the one hand, the choice of an analysis constrains the logical form of concepts that can be utilised in an interpretation; on the other hand, the form of the concepts of an existing theory (whether rigorously specified or implicit) constrain the choice of an appropriate technique of analysis for the empirical investigation of this theory. The choice of an analytic technique should ideally be made with full knowledge of both the structure of the methodology and the structure of the concepts of the theory which it is being employed to investigate.

B. THE STRUCTURE OF SCIENTIFIC CONCEPTS

As indicated above, this study is concerned with methodologies (observations, analyses, and interpretations) utilised in the formation of taxonomic and descriptive concepts rather than in the formation of concepts which postulate explanatory relations. However, the concept of causation which underlies such explanatory interpretations influences, in large part, the form of concepts that has been allowable in all phases of the scientific process to this time. That is, both measurement and interpretation have been guided by ideals for symbol use and manipulation which derive from a view of science as an explanatory endeavour, and consequently from the particular formal properties of the concept of causation. It will be argued that there are alternate forms of concepts which meet scientific requirements for rigor and yet more adequately reflect the complexity of these processes of measurement and interpretation. [2]

The formal structure of scientific concepts closely follows Aristotelean logic, and like the concepts of cause and effect, have generally been expressed in terms of necessary and sufficient conditions. Where the goal is the assignment of objects into classes that are representative of a particular concept:

> Each of the subclasses provided for in a given classification may be thought of as defined by the specification of necessary and sufficient conditions of membership in it, i.e. by stating certain characteristics which all and only the members of this class possess. Each subclass is thus defined by means of (more precisely as the extension of) a certain concept, which represents the complex of characteristics essential for membership in that subclass. (Hempel, 1965, p.138)

> Classification, strictly speaking, is a yes-or-no, an either-or affair: A class is determined by some concept representing its defining characteristics, and a given object falls either into this class or outside, depending on whether it has or lacks the defining characteristics. (Hempel, 1965, p.151)

There is, however, no reason to believe that all concepts conform to such a form:

> Consider for example the proceedings that we call "games". ...What is common to them all ? -Don't say: "There *must* be something common, or they would not be called 'games'"-but *look and see* whether there is anything common to all.-For if you look at them you will not see something that is common to *all*, but similarities, relationships, and a whole series of them at that....And the result of this examination is: we see a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities, sometimes similarities of detail.
>
> I can think of no better expression to characterise these similarities than "family resemblances".....
>
> But if someone wished to say: "There is something common to all these constructions -namely the disjunction of all their common properties"-I should reply: Now you are only playing with words. One might as well say: "Something runs through the whole thread-namely the continuous overlapping of those fibres". (Wittgenstein, 1976, sections 66-67, p.31-32)

It is, however, possible to give a formal definition of concepts that have properties similar to the properties of Wittgenstein's "games", and it therefore becomes possible to utilise this kind of concept in scientific analysis. Consider :

> A class is ordinarily defined by reference to a set of properties which are both necessary and sufficient (by stipulation) for membership in the class. It is possible, however, to define a group K in terms of a set G of properties *f*1, *f*2,...,*f*n in a different manner. Suppose we have an aggregation of individuals (we shall not as yet call them a class) such that:
>
> 1). Each one possesses a large (but unspecified) number of the properties in G
>
> 2). Each *f* in G is possessed by large numbers of these individuals; and
>
> 3). No *f* in G is possessed by every individual in this aggregate.
>
> By the terms of 3), no *f* is necessary for membership in this aggregate; and nothing has been said to either warrant or rule out the possibility that some *f* in G is sufficient for membership in the

> aggregate. Nevertheless, under some conditions the members would and should be regarded as a class K constituting the extension of a concept defined in terms of the properties in G. (Beckner, 1968, p.23)

Techniques of analysis exist for the formation of polytypic classes as defined by Beckner; they are referred to as methods of numerical taxonomy (Sneath & Sokal, 1973) or cluster analysis (Everitt, 1974). If a group of individuals are scored on a number of numerical variables, functions exist for the expression of the degree of similarity between these individuals. As well, a number of algorithms are available that will classify together individuals who share a certain degree of mutual similarity as measured by these coefficients. Once such classes are formed, the examination of the frequency of the values of the initial sets of variables will reveal patterns corresponding to the classes. While it is possible that necessary or sufficient conditions for the classification will emerge (in terms of the presence or absence in particular classes of particular variables or combinations of variables), there is no formal requirement in the specification of these methods that such be the case. Thus, the set of variables and their values that are characteristic of a class thus defined represent the extension of a polytypic concept that underlies the class.

Polytypic concepts also have relevance to the process of measurement. While the concepts of science need to be tied through the conventions of measurement to observable properties in order to allow replication, there is no reason that this connection be as rigid as that suggested by the operational definition (Bridgman, 1954) which restricts the meaning allowed in any symbol in a measurement set to a closed, specified set of observables. In fact, to the extent that some concepts are polytypic, the reliable judgement of statements descriptive of human experience are not generally amenable to definition in this manner. Consider the assessment of the presence or absence of depression in subjects' self-descriptive statements. We may begin by considering a variety of candidates for the necessary and sufficient conditions for the observation of depression (for example, specific words, such as 'sad' or 'meaningless', or their prescribed synonyms may be used to indicate 'depression'), but the impressive diversity of the statements which convey depression without these words (for example, 'I am at a total loss about what to do with my life') may lead us to reject the existence of an observation or a conjunction of observations that would serve to reliably index it. In a similar argument Koch (1976) concludes:

> To insist on fixing the definition, via a standard linkage relation, to some tightly restricted observation base... would be to sacrifice the possibility of precise or subtle communication. (Koch, 1976, p.521)

Clearly, concepts of this type are akin to "games" and require an extremely complex and perhaps incompletely explicable set of measurement operations for their valid use; even though skilled judges within a community of interest that uses language similarly may be able to make such assessments reliably enough for scientific analyses and interpretations and even though their subsequent analyses may be completely explicated.

C. ANALYSIS OF EXPERIENCE IN PSYCHOLOGY

> *Introspective Observation is what we have to rely on first and foremost and always.* The word introspection need hardly be defined - it means, of course, the looking into our minds and reporting what we there discover. Every one agrees that we there discover states of consciousness. So far as I know, the existence of such states has never been doubted by any critic, however sceptical in other respects he may have been. That we have cogitations of some sort is the inconcussum in a world most of whose other facts have at some time tottered in the breath of philosophic doubt. All people unhesitatingly believe that they feel themselves thinking, and that they distinguish the mental state as an inward activity or passion, from all the objects with which it may cognitively deal. *I regard this belief as the most fundamental of all the postulates of Psychology*... (James, 1895, Vol I., p.185)

Despite James' insistence that psychologists rely on introspective observation 'first and foremost', the brief history of psychology has shown that his imperative is extremely difficult to heed. A review of this history indicates that, along with some of the more familiar difficulties (such as unreliabiliity and social desireability effects), there has been a *general* failure to appreciate that polytypic concepts may be appropriate for studying experience. Psychology's approaches to experience have been varied. First came the attempt to explain experience by analyzing it directly using elementalistic introspection as a scientific method. Next came the rejection of both the data of experience and the task of explaining it, not because they were unreal, but because they were thought to be scientifically intractable. Then, information derived from introspection was employed in theoretical systems whose primary focus was the explanation of cognition as distinct from experience. Currently, some psychologists are returning to the attempt to analyse and explain experience, although they continue to emphasize necessary and sufficient conditions in the definition of experiential concepts.

In 1879 in Leipzig, Wundt founded the first laboratory for the scientific study of psychology (Boring, 1950). The psychology practised there attempted to provide an explanation of experience and dominated the theory and method of psychology for almost 40 years before criticisms led to a shift away from its methods. For Wundt, consciousness consisted of creative syntheses of irreduceable elements of experience which were immediately present to individual awareness. The examination of these elements, later distinguished as sensations and feelings, in terms of their necessary and sufficient attributes, such as duration, intensity, extensity, and quality, would provide a taxonomy for the analytic reconstruction of common experience and lead to the discovery of the principles of this reconstruction as it occurred in the individual consciousness. In classical introspection, then, the concept of mental elements and their associated attributes is explicitly Aristotelean; the presence or absence of particular attributes were both necessary and sufficient conditions for the classification of sensations and feelings. The method for the fulfillment of this program, now referred to as classical introspection, consisted first of the observation of the basic elements of experience and their attributes as they entered the awareness of the observer, and second of a description of these elements which was free from the creative syntheses that normally transform them. To achieve this second stage required specialized training. The program then rests upon the following assumptions:

a. that experience is reduceable to a set of basic elements which are common to all individuals; and,

b. that these elemental contents are directly accessible to awareness in their atomic form.

Introspective psychology was criticised on both theoretical and methodological grounds. James argued that consciousness was analogous to a stream, with no portion analytically separable from that stream. This assumption contrasted with the assumption of classical introspectionism about the constitution of consciousness, and formed the basis of the suggestion that a naive, that is theoretically suppositionless, introspective strategy was more appropriate for psychological study. Thus, James relied upon introspective reports of untrained observers. This introspective strategy was to became a part of systematic analytic procedures only much later. James' criticism, however, occurred from within the tradition of introspective observation. More fatal were the objections to the results flowing from classical introspectionism itself. First, the duration of the adequate description of a short awareness often exceeded the duration of that awareness by extremely large factors (Boring, 1953). Second, the close association of the trained observer to the purpose and expectations of the particular experiment lent doubt to his ability to describe without interpreting. Finally, the inability of laboratories to replicate introspective analyses reported elsewhere and the resulting arguments about proper method were attacked by Watson (1913) in a paper that was to signal the end of the paradigm.

The advent of behaviorism signalled a shift in both the purpose and the observational substrate of the science of psychology that was strongly influenced by the philosophy of logical positivism then becoming current through the efforts of the Vienna Circle (Ayer, 1936). The explanatory focus for psychology became behavior, and the replicability and public nature of observations were stressed in response to the tenet that scientifically meaningful statements could only be produced if they were verifiable (and hence falsifiable) in principle. While the existence of experience was not denied, its study was ruled unscientific since observations concerning it were not subject to this stringent verifiability; no evidence could be brought to bear on the truth or falsity of the individual's report about his experience. The paradigm of behaviorism persisted basically uncriticised for 50 years, and still strongly influences the majority of current psychology.

As has been pointed out (Ericcson & Simon, 1978, 1979), however, Watson distinguished between introspection and verbal data in a way that future behaviorists did not. Thus, protocols collected from subjects thinking aloud during the solution of a problem were deemed to constitute acceptable data for the construction of theory about thinking. (In Watson's view thinking consisted of subvocal speech that could be made overt and could thus be seen to be behavior). Gestalt psychologists (for example, Duncker, 1945) also encouraged subjects to think aloud and utilised the information in the construction of theories about cognition. More recently, with the advent of high speed digital computers, the protocols from subjects thinking aloud have been employed to guide the construction of complex programs which attempt to simulate human thought patterns (Newell & Simon, 1972). Several properties of the use of such data are important. First, it is accepted as fallible and used as a basis from which theory is to be abstracted. Second, it is not employed in the explanation of experience. It is instead employed in theories which refer to explicitly measurable public variables such as sequences of verbalisation and durations of stages in problem solution, and which derive plausibility as potential explanations of unobservable mental processes from the success with which they account for these variables. Experience, where implied at all, is treated as a theoretical construct. Essential to this use of verbal report was the shift in the philosophy of science dominant in psychology from logical positivism to logical empiricism (Cronbach & Meehl, 1955; Rozeboom, 1970) which allows the use of theoretical constructs tied indirectly to observations through nomological networks of a variety of observations. This divorce of the observational language from the theoretical language also accomodates more readily the possibility of individual differences within the same theoretical structure which treats nomothetic features.

The step to explicitly treating experience as a focus in scientific psychological activity, while treating it as a theoretical construct rather than as a directly accessible given, is taken by phenomenological psychologists (Van Kaam, 1966; Collaizzi, 1969, 1978). As is the case within cognitive psychology, protocols of verbal behavior are treated as resultants from a chain which includes, but does not exhaust, experience, and as such, provides fragmentary information about presumed experience paralleling it. The assent of the experiencer to the validity of the reconstruction of experience is neither sought nor considered essential. Instead validity is assessed by the degree to which derived concepts can be utilised in the examination of further protocols. Phenomenological psychologists further argue that even in the context of an enlightened behavioral psychology which allows certain forms of verbal data, the full complexity of experience has not and cannot be properly explored without the use of minimally structured protocols (Giorgi, 1970). Consider, for example, the use of questionnaire items. Such items typically employ sentences that refer to experience. However:

a. the experiential concepts employed in the sentences are themselves not well defined. This is a problem for the individual responding to the item because he has no way of knowing whether his understanding of the experience denoted by the term will correspond to the experimenter's.

b. the response itself, because it must be fitted into one of a small number of categories, minimizes the ability of the subject to communicate the contents of his experience to the experimenter.

c. the potential exists for the individual to retrospectively reinterpret his experience in a way that has been suggested by the form of the experimenter's question rather than the structure of his experience.

The phenomenologist's arguments for concepts whose complexity matches the 'lived world', and against reactive and confining questionnaires, would seem to suggest that phenomenological psychologists respect the status of polytypic concepts. This is reinforced by their rather subtle analyses of experiences such as anxiety (Fischer, 1978) and psychopathology (Binswanger, 1958), although these analyses have not generally involved measurement or analytic strategies that are articulable or replicable. This final step, scientifically treating the concept of experience as polytypic, has not been taken. In phenomenological psychology, even when a semblance of measurement and analytic explication is reported, the authors insist on a form of concept use that depends on necessary and sufficient conditions rather than polytypic features. Consider the method proposed by Van Kaam (1966) and Colaizzi(1969, 1978). As discussed by Colaizzi (1978), this procedure consists of the following steps:

a. the collection of written reports surrounding a particular experience (such as the experience of 'being impressed by reading something to the point of modifying one's existence',' Colaizzi, 1978).

b. the extraction of *significant statements* from a collection of such reports, where significant statements are statements thought to directly pertain to the experience being investigated.

c. the re-expression of these significant statements in terms of *formulated meanings*, where formulated meanings refer to latent meanings underlying the particular words used by the subjects.

d. the organisation of these formulated meanings into *clusters of themes*.

e. the re-expression of these clusters of themes into an *exhaustive description* that includes all of the formulated meanings embodied in the themes.

f. the extraction of a set of statements that specify the *fundamental structure*, the necessary and sufficient conditions for *having had* the formulated experience.

While phenomenological psychologists acknowledge the complexity of experience, they have not been able to derive a concept formation strategy that will maximize the potential for capturing this complexity. In addition, this failure has had direct empirical repercussions. For example, Collier and Kuiken (1977) were unable to identify the necessary and sufficient criteria for the occurrence of the aesthetic experience of poetry, suggesting that, at least at higher levels of abstraction in the specification of domains of experience, such criteria may not exist.

D. A METHODOLOGY FOR THE FORMATION OF EXPERIENTIAL VARIABLES

The methodology proposed here will attempt to surmount the problems of both phenomenological and traditional methods when dealing with the complexities of human experience by assuming that both the concepts involved in the measurement of experience and the concepts involved as the result of any analysis are polytypic. For this reason, the method will rely primarily upon the experience and sensitivity of the individual researcher to reliably derive symbols amenable to analysis from observations, although the attempt will be made to specify this procedure as rigorously as possible. Furthermore, the lack of constraints upon the individuals who report their experience will force the experimenter to attend to those experiences rather than react to the experimenter's suggestive questionnaire. If it is the case that such measurements can be made reliably (given suitable perceptual training), there can be no a priori reason for their exclusion from scientific practise since any consequent technique of analysis will be blind to the complex meaning network implicitly present in the symbols it transforms. Further, the technique of analysis employed will be rigorously defined so that it can be adequately communicated across researchers even without the restrictions of language group membership implied for the measurement procedure.

The methodology itself is an extension of that proposed by Kuiken (1981). It examines the experience of individuals as that experience is reported by them. Thus the measurement procedure entails the development of symbol sets based upon sets of language patterns expressed as phrases or sentences. A set of binary variables is formed by noting the presence or absence of polytypic concepts which define complexes of meaning in spontaneous speech. Rather than being derived by the researcher, these concepts are derived from the patterns of language in the following manner:

a. transcripts are searched for phrases, sentences, or groups of sentences that contain overlapping meaning where such meaning is at least partially specified by the occurrence of the same or synonymous words or groups of words (but without the requirement that the overlap be complete).

b. these groups are rephrased into a single sentence which attempts to embody a polytypic concept characteristic of the assemblage of sentences.

Once a set of such binary variables is formed, the individuals whose reports have been utilised are grouped by the methods of cluster analysis into a set of polytypic classes. The frequency of the set of binary variables within each of these classes is examined and the sentences which these variables represent form the definition of a polytypic concept underlying the class. The assumption that these polytypic concepts represent types of experience is external to the method, and not necessary to its realisation.

E. DEMONSTRATION OF THE METHODOLOGY

Aesthetic perception is chosen as the particular focus for application of the proposed methodology because the full range of human responses to aesthetic objects has not been articulated (Kuiken & Collier, 1977) and because it is widely understood that the experiences of individuals in reacting to aesthetic objects differ dramatically. Thus, aesthetic perception is a particularly suitable candidate for the application of a methodology oriented toward discovering types of experience. The emergence of polytypic concepts in the analysis would call into question the validity of the methods employed by Collaizi in the analysis of experience, for it would imply that, at least for a domain specified at a relatively abstract level, there are no necessary or sufficient conditions that define a fundamental structure of experience.

As well, there is a tradition of research by experimental psychologists in aesthetics beginning with the pioneering research of Thurstone (1959) in the scaling of aesthetic preferences and extending to the multivariate examination of questionnaire and experimental variables by a group of psychologists headed by Berlyne (Berlyne, 1975). This tradition provides, on the one hand, a series of findings for comparative purposes, as well as, on the other, a series of tools that can profitably be used in parallel to the analysis of verbal behavior. For example, if it is the case that distinct types of experience can be isolated, they may or may not correspond to typologies and variables derived by traditional experimental methods. The demonstration might indicate the extent to which distinctions made by experimental psychologists can be related to the aesthetic experiences of individuals.

II. EXPERIMENT I

A. METHOD

Subjects

Subjects were 27 students from introductory psychology classes at the University of Alberta. The data from one subject was discarded because his comprehension of the English language was insufficient for him to understand the instructions.

Procedure

Each subject was met at the door of the experiment room and led to a chair which was isolated from the rest of the room by dividers to the left and right. The experimenter requested that the subject be seated and become comfortable.

The experimenter explained that it was important for the subject to remain relaxed for the remainder of the session, and played a short tape-recorded relaxation procedure loosely based upon the technique of deep muscle relaxation (Rimm & Masters, 1974). Then the experimenter read from a prepared script which:

a. explained that the subject would later be requested to report as accurately as possible his experience of a painting while trying to focus his full attention upon the particulars of that experience;
b. demonstrated this style of reporting experience; and
c. solicited approval for the audio tape-recording of

his verbal responses.

The script (including the relaxation procedure) is included as Appendix 1.

The subject was then shown a practise picture. The picture was projected onto a rear projection screen approximately four feet in front of the subject. The subject was asked to verbalise his experience and was prompted if he showed difficulty or requested aid.

Subsequently, he was presented with the test picture in the same manner and his verbal responses were recorded on tape for four minutes. The painting was a portrait of Giuliano de' Medici painted circa 1476 by the Florentine artist Botticelli.[3]

At the end of this time, the subject was asked to complete a questionnaire derived from questionnaires used by Berlyne (1975), with the addition of several items of the author's construction.[4] This questionnaire is included as Appendix 2. Finally, the subject was debriefed according to a standard procedure which is included as Appendix 3.

B. ANALYSIS AND RESULTS

The tapes containing the subjects' responses to the painting were transcribed to line files in disk storage in the University of Alberta Computing System to allow preliminary analysis using computerized techniques. This transcription process included identification of meaning units focused around a single aspect of the experience of viewing the painting. Meaning units were separated from each other by the author on the basis of implied punctuation (principally pauses) and on the basis of changes in the referential focus of subjects' speech. A complete listing of the transcripts for all subjects by meaning unit is contained in Appendix 4. [5]

Data manipulation consisted of the following stages:

a. location of similarity in meaning units from different subjects' transcripts,

b. construction of binary numeric variables to represent these phrases, and

c. analysis of the data matrix containing the numeric variables by the methods of cluster analysis.

The location of similarity was based upon intensive examination (and reeaxamination) of the transcripts, supplemented, where possible, by the use of computerized techniques. [6] The construction of variables was guided by the suggestions of Kuiken (1981) . Groups of similar meaning units were examined for the occurrence of a phrase that could be thought to be an acceptable paraphrase [7] for each of the similar meaning units. Alternatively, such a phrase was constructed. Each meaning unit for which the phrase was deemed by the author to be an acceptable paraphrase was considered an occurrence of a variable denoted by the phrase. Each such variable was called a constituent.

An example might clarify this process. Consider these meaning units:

a. It has the shape of a human but it just doesn't look real. (Subject 1, Unit 4)

b. It doesn't look realisitic at all, the person at least. (Subject 11, Unit 4)

c. Oh, its...it doesn't look real at all. Doesn't look like it could actually be a person. (Subject 14, Unit 1)

d. Guy looks pretty strange. I don't know, something to do with his nose, eyes. (Subject 21, Unit 2)

e. ...Nothing seems to really be...to make much sense, it doesn't look too realistic. (Subject 26 Unit 1)

The first three meaning units fit clearly into a paraphrase such as : 'The figure doesn't look real'. The fourth constituent would be excluded because, while it is possible that the 'strangeness' referred to might derive from the 'unreality' of the figure, and that the subject might easily and quickly accept the paraphrase 'You mean the figure doesn't look real ?', his acceptance might also require reflection. Given that ambiguity of interpretation, the conservative course is chosen and the item is excluded. Similarly, the final constituent would be excluded not because the subject does not refer to 'unreality' but because he does not distinguish the figure as a specific locus of unreality.

A binary string was formed for each constituent by assigning the value 1 to each subject whose transcript contained an occurrence of the constituent, and the value 0 to each subject whose transcript did not contain an occurrence of the constituent. Table I contains a list of the constituents by number and the frequency of occurrence of each constituent within the transcripts. Appendix 5 contains a full listing of the binary strings constructed from the constituents.

For the 107 constituents of Table I, there was a total of 529 positive occurrences in the 495 meaning units (9586 words) derived from the transcripts of the 26 subjects. Although in many cases a single meaning unit contributed to more than one constituent, these figures do indicate that the level of entirely idiosyncratic responses to the painting was low. However:

a. only 4 constituents contained positive occurrences for more than half of the 26 subjects (including 2 constituents concerned with 'being stuck');
b. only 24 constituents contained positive occurrences for more than one quarter of the subjects; and
c. a total of 33 constituents were shared by only two subjects.

Thus, 81.0 % of the data matrix cell entries were zeros.

The constituents of Table I also differ in terms of content:

a. 30 constituents (accounting for 154 positive occurrences) were descriptive or primarily descriptive of the content (for example, 'The background doors are large.');

TABLE I SIMPLE CONSTITUENTS AND FREQUENCIES

NUMBER	FREQUENCY	CONSTITUENT PHRASE
1	19	I am stuck.
2	15	The man looks arrogant.
3	15	I am stuck again (for the second time)
4	13	I don't know the purpose of the bird.
5	12	The man is looking down.
6	12	There is an open door behind the man.
7	10	The man has a big (long) nose.
8	10	The bird blends into the man's sleeve.
9	10	There is a window in front of the man.
10	9	The striking red is the first thing you see.
11	9	I am uncertain about the expression on the man's face.
12	9	The man seems evil.
13	8	There is a line in the man's forehead.
14	8	The red of his clothes is bright.
15	8	I didn't notice the bird immediately.
16	8	The clothes are on backwards.
17	8	The man appears rich.
18	8	I am stuck again (for the third time).
19	7	I don't like the man.
20	7	The man has just come in.
21	7	The man appears religious.
22	7	The painting is from the 16-17 century.
23	7	I am considering the color characteristics of the painting.
24	6	The man's eyes are almost closed.
25	6	I note the blue of the background (sky).
26	6	The bird contrasts with the man in the painting.
27	6	The painting is simple.
28	6	The painting has many straight lines.
29	6	The painting is a portrait.
30	6	I notice color contrast in the painting.
31	6	The bird does not fit.
32	6	I attribute ethnicity to the man.
33	5	I don't like the painting.
34	5	The man appears to be actually looking down his nose.
35	5	I do not know whether there is a door or a window.
36	5	The setting is medieval.
37	5	The facial features are strange.
38	5	The painting is unrealistic.
39	5	The man is closed (resisting).
40	5	The open door has symbolic significance.
41	5	I wonder what he's thinking.

42	5	The bird is a symbol.
43	5	I am considering the red portion of the painting as a color characteristic of the painting.
44	5	This painting doesn't fit a style.
45	5	The artist showed good technique.
46	5	The background of the painting is dim.
47	5	I am interested in the perspective,(the feeling of depth and how it is created).
48	4	The man's lips are curved.
49	4	I note the black of his hair.
50	4	I note the white of the collar.
51	4	The figure fills the picture.
52	4	The painting contains its own frame.
53	4	The bird and the man are facing different directions.
54	4	The painting seems cold.
55	4	The person looks unreal.
56	4	The painting is odd.
57	4	The artist had a purpose but I'm not sure what it was.
58	4	The branch on which the bird sits is unusual.
59	4	The painting is a portrait influenced by the patron.
60	4	The facial area is painted with good technique.
61	4	I am bored by the painting.
62	4	My mind is wandering from the painting.
63	4	I note the man's set (straight) jaw.
64	4	The man is neat and clean.
65	3	The man's clothes are trimmed with fur.
66	3	The bird sits on the sill.
67	3	The man's nose is ugly.
68	3	My attention is drawn to central figure.
69	3	The man is looking at something particular.
70	3	The hair looks strange.
71	3	I don't know why this painting was painted.
72	3	The person seems cold.
73	3	The man's head is backwards.
74	3	The man is being reprimanded (or in court).
75	3	There is a contrast between hardness and softness in the painting.
76	3	This painting is a portrait but it is ambiguous.
77	3	This is an abstract painting.
78	3	This painting is not a portrait.
79	3	The painter has capture texture well in the painting.
80	3	I am considering what the wall is made of.

81	3	The man has a humorous expression.
82	3	The man is stern.
83	3	The man is smug.
84	3	I am stuck again (for the fourth time).
85	2	The man's face is not symmetric.
86	2	I note that the man's sleeves are brown.
87	2	The bird is not unordinary.
88	2	The bird has red feet.
89	2	There is an open window behind the man.
90	2	I note the brown of the background structure.
91	2	The background doors are large.
92	2	I like the painting.
93	2	I almost feel a part of the painting.
94	2	The man is staring without looking at anything particular.
95	2	There is a light shining into the room.
96	2	The man initially looks feminine.
97	2	The clothing is strange (but not backwards).
98	2	The man appears to be in the army.
99	2	The line in his forehead is a tension line.
100	2	The man's nose is a family characteristic.
101	2	The man is from the ancient era.
102	2	The painter showed poor technique (just 'laid it on')
103	2	I am thinking about the experiment.
104	2	I am comparing the two pictures that I saw.
105	2	The man reminds me of a friend.
106	2	I associate the background with freedom.
107	2	The bird and the man are both staring.

b. 43 constituents (accounting for 194 positive occurrences) were interpretive or primarily interpretive in nature (for example, 'The man seems evil');

c. 15 constituents (accounting for 69 positive occurrences) were related to technical aspects of the painting (for example, 'The painting has many straight lines'); and

d. only 19 constituents (accounting for 119 occurrences) focused upon the subjects' subjective experience (including 7 constituents and 55 occurrences related to 'being stuck'). An example is 'I almost feel a part of the painting.'.

During the construction of the constituents, two problems emerged. First, the formation of variables in this manner does not address a problem of different logical levels that emerges in the expression of a constituent. To illustrate, consider the pair of constituents 'The painting is unrealistic' and 'The painting is odd' (the latter without reference to the concept of realism). If (as was the case) several transcripts contain one or the other of these constituents and not both, any simple formation of two variables (each scored 1 or 0) will introduce a negative relationship between the resultant variables. This increases the probability that individuals who showed instances of these constituents would be separated in a cluster analysis. While the differences between the experiences which these two variables represent might in fact be important, it is also possible that their potential importance in a cluster analysis is the meaning that they share with a higher order constituent such as 'The painting is strange or unusual'. The inclusion of such a higher order variable in the constituent list would increase the probability that these subjects would be clustered together. In the present study, certain hierarchically higher order variables, such as the preceding example, were included in the set of variable strings along with the hierarchically lower order constituents.[8]

Second, it is apparent that a strict observance of the requirement that a constituent must be clearly present in or directly implied by a meaning unit before it is judged to have occurred might miss a significant basis for similarity between subjects to the extent that this basis is perceptible to the investigator but is perceived dimly if at all by the subject. For example, variables based upon the subjects' style of discourse, direction and redirection of attention, etc. could be assessed by the investigator even though not available as part of the subjects' explicitly reported experiences. Inclusion of this type of constituent is not without its drawbacks. The original intention in restricting the constituents to clear and acceptable paraphrases was to allow clustering according to subject's explicitly communicated meanings. If investigator assessments are also allowed, the probability that divergent sets of variables would be derived by different researchers is increased. In the present study, it was decided to allow some such variables to be employed in the hope that they would be related to some of the constituents and therefore improve the interpretability of resulting clusters.

By reexamining the constituents of Table I, and by carefully examining the transcripts and abbreviated paraphrases of them, 26 additional variables were derived and scored. The first ten are of the hierarchically higher type first discussed; the last 16 are of the investigator assessed type. Their inclusion raises the number of variables from 107 to 133. They are presented in Table II.

The data matrix was reduced to subject by subject similarity matrices using Euclidean distances and correlations as candidate metrics, for both the original set of 107 variables and the extended set of 133 variables. [9]

In order to assess the degree of structure in the data, the distribution of intersubject similarities was tabulated and compared to the distribution in similarity matrices produced when the original data vectors were randomized within each subject (Baker & Derwing, 1981). [10] All distance distributions were unimodal and symmetric. The mean Euclidean distance between subjects was 6.44 with a standard deviation of 0.563 for the 325 distances of the lower triangular matrix of the intersubject similarity matrix. Over 20 replications (6500 distances), the mean intersubject distance in the random matrices was 6.69 with a standard

TABLE II COMPLEX VARIABLES AND FREQUENCIES

NUMBER	FREQUENCY	CONSTITUENT PHRASE
108	9	The painting is strange.
109	12	I note contrast in the painting.
110	15	I am thinking about the purpose of the bird.
111	6	I am thinking about where the man is standing.
112	8	The artist had a purpose in painting this picture.
113	7	I am explicitly evaluating the artist's technique.
114	9	The painting fits a style.
115	17	I am placing the painting in a temporal context (by era).
116	11	I have dated the man in the painting.
117	6	I have dated the painting.
118	7	I am interpreting this painting by trying to tell a story about the man's location, actions and expression.
119	4	I am interpreting the painting as a complex symbol of the artist's and looking for latent meaning.
120	3	I am interpreting the painting as a statement about the psychology of the man.
121	11	I report a change in visual perception (perspective) of the painting.
122	8	There is a perceptual ambiguity in the painting.
123	6	I am occupied by perceptual aspects of the situation of the painting that are hidden from the viewer.
124	5	I am considering the artist's perspective and/or sensibilities (independently of his ability).
125	8	I see expressive/emotional characteristics in objective features of the painting (not the face).
126	7	I am reflecting on my own thoughts and reactions to the painting.
127	13	I attribute an enduring trait to the man.
128	13	I attribute a momentary state to the man.
129	7	Reports or interprets further aspects consistently in light of initial reaction.
130	10	Moves from aspect to aspect without

		returning in unorganised, jumpy, descriptive manner.
131	4	Returns to a topic or reaction previously unresolved.
132	4	Comments about structural technical aspects of the painting as a whole in an analytic manner.
133	7	Changes reaction or interpretation of the painting as the experience has progressed.

deviation of 0.456. The results for intersubject correlation were similar. The mean correlation was 0.075 with a standard deviation of 0.109 in the data matrix and 0.000 with a standard deviation of 0.088 over 5 replications in the random matrices. Since the mean of the distribution of distances derived from the data falls outside the 0.01 confidence interval for the mean of the randomly generated distances, it can be concluded that the data are not random.

Consequently, the intersubject similarity matrices were cluster analyzed. Multiple analyses were performed to assess the extent to which stable clusters emerged which transcended metric and cluster algorithm.[11] The methods were:

a. Hierarchical fusion by minimizing the error sum of squared Euclidean distances (Ward, 1963) where the error sum of squares is defined as the sum of squared distances from each individual to the parent cluster centroid.

b. Ward's method applied to correlation coefficients (Edelbrock, 1979).

c. Iterative relocation to minimize the error sum of squares beginning from a Ward's method partial solution (Wishart, 1978) using solutions derived from both Euclidean distances and correlations.

d. Iterative relocation from a random partition (Wishart, 1978) for both Euclidean distances and correlations.[12]

Table III shows the dendrogram for the 26 subjects for Ward's method on Euclidean distances and Table IV shows the dendrogram for Ward's method on correlations.[13] Visual examination of Table III suggests the presence of two clusters (although the membership of the pairs (11,14) and (13,16) in cluster 1 is questionable). Visual examination of Table IV suggests the presence of three clusters. The visual inspections are reinforced by the simulation analysis described earlier. In the solution for Euclidean distances joinings at or above the level of .42, and in the solution for correlations joinings at or below the level of -0.25, indicate distances that would occur by chance fewer than 5 per cent of the time.

These two solutions correspond to each other as follows:

a. Five of the 6 members of cluster 1 in the correlation solution belong to the first cluster in the Euclidean solution.

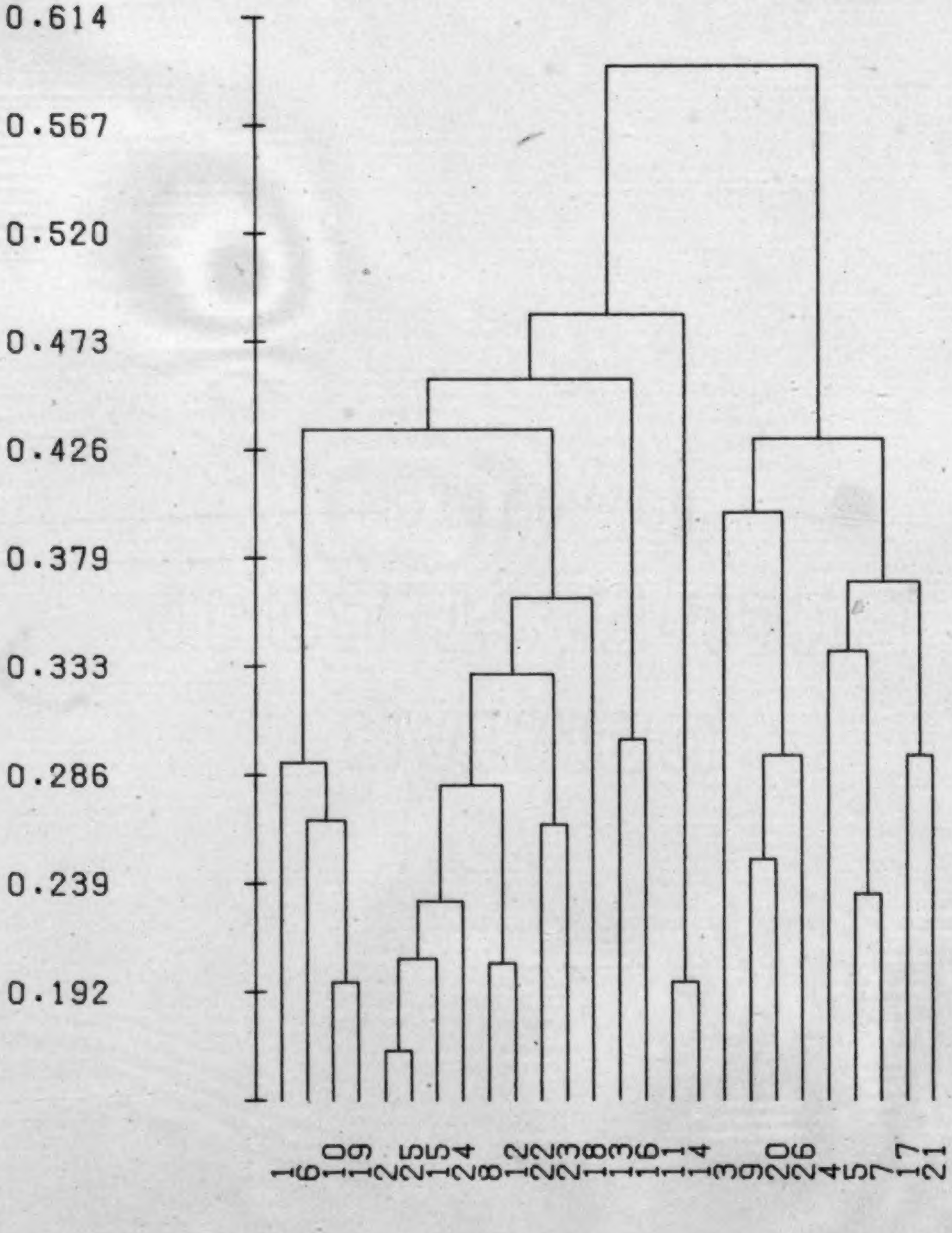


TABLE III DENDROGRAM OF WARD'S METHOD ON DISTANCES

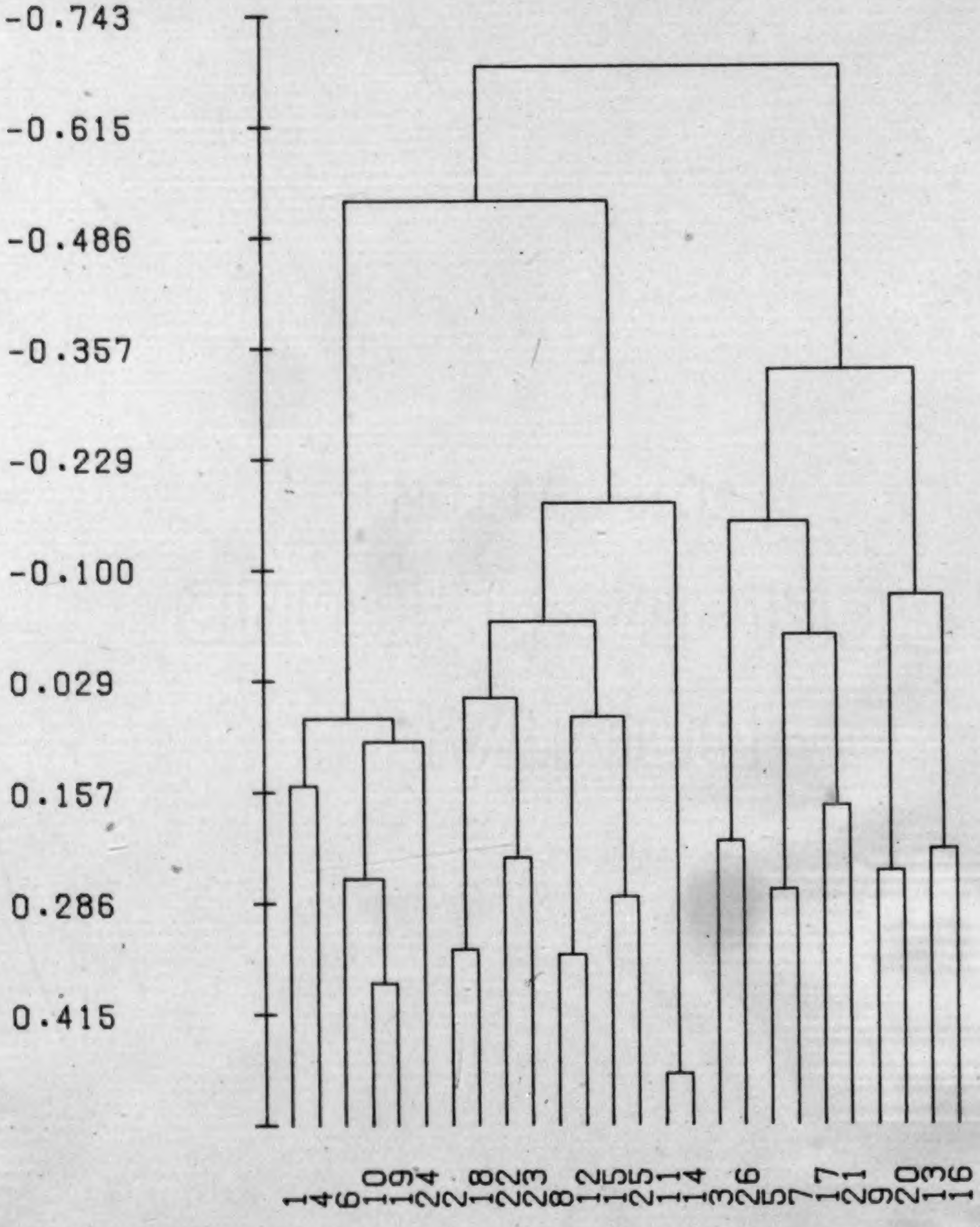


TABLE IV DENDROGRAM OF WARD'S METHOD ON CORRELATIONS

b. All 10 members of cluster 2 in the correlation solution belong to the first cluster in the Euclidean solution.

c. Eight of the ten members of cluster 3 in the correlation solution belong to cluster two in the Euclidean solution. (The previously mentioned pair (13,16) is the exception).

An examination of the distribution of distances between cluster members compared to the distribution of distances between members of different clusters gave the following results:

a. For the two cluster solution, the within-cluster mean distance was 6.27 for Euclidean distances and 0.11 for correlations as opposed to 6.63 and 0.03 for the between-cluster distances respectively.

b. For the three cluster solution, the within-cluster mean distance was 6.26 for Euclidean distances and 0.13 for correlations as opposed to 6.53 and 0.05 for the between-cluster distances respectively.

All mean rank differences were found significant at levels below 0.01 by the Mann-Whitney U test.

The three cluster solution was chosen for interpretation for the following reasons:

a. The visual structure of the three cluster solution in Table IV is more compelling than the solution shown in Table II in that cluster joining levels are more clearly discontinuous.

b. The high degree of overlap of the solutions suggests that the three cluster solution partitions the members of the first cluster in the first solution into two groups; if the two cluster solution is correct, its partitioning in this way should lead to few or unreliable differences between the partitions. Ultimately this is an empirical issue.

c. The within-cluster distance distribution of the three cluster solution indicates (if slightly) the larger homogeneity of the three cluster solution.

In order to interpret the structure of the clusters indicated by the three cluster solution on correlations in terms of the original item pool, a number of techniques were employed:

a. The items were ranked by their frequency of occurrence within each cluster.

b. Ratios of the occurrence of items within clusters to occurrence within the full sample, and ratios of occurrence of items within cluster to occurrence outside clusters were calculated.

c. The thirteen items which showed the highest ratio of within cluster to outside cluster occurrence (and which were present in two thirds of the members of at least one cluster) were used in a three group linear discriminant function analysis. Classification of subjects to clusters using these functions was 100 per cent.

d. All items were correlated with the linear discriminant functions.

e. All items were also correlated with 3 dummy variables expressing group membership in the 3 clusters.

Table VI shows four groups of items derived from this analysis. The first group consists of items whose occurrence was not differentially associated with group membership in any of the three clusters, and the remaining three groups show items whose occurrence was associated with membership in one of the clusters. The items in Table VI are ranked in terms of frequency of occurrence within cluster. [14]

An examination of the nondifferentiating items gives a picture of the general reaction of subjects to this painting. They described it as a portrait of a rich, arrogant man wearing bright red who is looking down through a window. They sometimes did not notice the bird immediately, thought it blended into the man's sleeve, and could not understand its purpose in the painting although they sometimes noted that it provided contrast to the man. While this kernal description was not provided by all subjects in all facets, most subjects provided some facets and no single facet was associated differentially with cluster membership.

In addition to the above, the subjects in cluster 1 tended to express uncertainty about various facets of their experience of the painting, change their reactions to it,

TABLE V - ITEM GROUPS FOR THREE CLUSTER SOLUTION

NONDIFFERENTIATING ITEMS

The man looks arrogant.
I don't know the purpose of the bird.
The man is looking down.
The man has a big (long) nose.
The bird blends into the man's sleeve.
There is a window in front of the man.
There is a line in the man's forehead.
The red of his clothes is bright.
I didn't notice the bird immediately.
The man appears rich.
The painting is from the 16-17 century.
The bird contrasts with the man in the painting.
The painting is a portrait.
I notice color contrast in the painting.
The bird does not fit.
I attribute ethnicity to the man.
I don't like the painting.
The man appears to be actually looking down his nose.
This painting doesn't fit a style.

ITEMS DIFFERENTIATING CLUSTER 1

I attribute a momentary state to the man.
I am uncertain about the expression on the man's face.
The man seems evil.
I am thinking about where the man is standing.
Changes reaction or interpretation of the painting as the experience has progressed.
The artist showed good technique.
The bird and the man are facing different directions.
I am explicitly evaluating the artist's technique.
I am interpreting this painting by trying to tell a story about the man's location, actions and expression.
I am reflecting on my own thoughts and reactions to the painting.
The branch on which the bird sits is unusual.
The man is neat and clean.
This painting is a portrait but it is ambiguous.

The man looks feminine.
The clothing is strange (but not backwards).
I am interpreting the painting as a statement about the psychology of the man.
Returns to a topic or reaction previously unresolved.

ITEMS DIFFERENTIATING CLUSTER 2

I am stuck again (for the second time)
Moves from aspect to aspect without returning in unorganised, jumpy, descriptive manner.
I am stuck again (for the third time).
The man appears religious.
The painting is simple.
I have dated the painting.
I note the white of the collar.
The figure fills the picture.
The man's clothes are trimmed with fur.
The man has a humorous expression.
The man is looking at something particular.
I am considering what the wall is made of.
The man is stern.
I am stuck again (for the fourth time).
The man appears to be in the army.
The man's nose is a family characteristic.

ITEMS DIFFERENTIATING CLUSTER 3

The painting is strange.
The striking red is the first thing you see.
The clothes are on backwards.
I am considering the color characteristics of the painting.
The artist had a purpose in painting this picture.
I note the blue of the background (sky).
The facial features are strange.
The open door has symbolic significance.
The painting is odd.
The painting is unrealistic.
The bird is a symbol.
I am considering the red portion of the painting as a color characteristic of the painting.
The background of the painting is dim.
The man is closed (resisting).
The painting is a portrait influenced by the patron.
The facial area is painted with good technique.
My attention is drawn to central figure.
The man's head is backwards.
This is an abstract painting.

I am interpreting the painting as a complex symbol of the artist's and looking for latent meaning.
I am considering the artist's perspective and/or sensibilities (independently of his ability).
Comments about structural technical aspects of the painting as a whole in an analytic manner.

---

and sometimes return to unresolved facets of it. As well, these subjects tended to interpret the painting as a slice from a larger time frame and either present a storied interpretation of the character or attributed short term motives to the central character. (This cluster is more fully discussed on page 54).

The subjects from the second cluster, on the other hand, are characterized primarily by the fact that they had difficulty with the experience, becoming easily stuck and lacking a focus. They tended to find the painting a simple one, although their comments were largely about very specific picture fragments, unintegrated into a coherent whole (for example, comments on the color of the man's collar and on the fur trim of his cloak). It should also be noted that the group of items differentiating this cluster appears to contain incongruities such as humour and lack of humour (The man has a humorous expression, The man is stern) and religiosity and militarism (The man appears religious, The man appears to be in the army). While this is consistent with the inability of these subjects to form a unified interpretation of the painting, it also suggests the possibility that differentiable subclasses exist in this cluster. This possibility is considered in detail below.

The subjects of the third cluster were united in finding the painting and some of its aspects odd or strange, some thought it so strange that they labelled the painting abstract and thought the man's head was 'on backwards'. Others attempted to infer the artist's symbolic intentions in the painting. The subjects in this cluster also seemed more sensitive to formal and abstract color characteristics of the painting than other subjects.

The preceding analysis indicates the presence of significant grouping within the data, and the resulting groups are associated with constituents which suggest interesting variations in reactions to the painting. However, there are two reasons to consider finer subgrouping than is provided by the 3 cluster solution :

a. There appear to be incongruities among the constituents associated with a particular cluster within that solution (as noted previously).

b. If joinings in a hierarchical cluster analysis should occur at distances considerably below chance levels, indicating a higher than chance level of homogeneity within cluster members, many more clusters are indicated to be present in the current data than three. [15]

Because of the small size of the sample employed in this study, the analysis of finer subgroupings cannot support statistical conclusions. There is no intention here to argue that any such subgroupings are representative of a larger population. They would, however, be descriptive of the subjects who participated in this experiment and they would provide a demonstration of the *form* of the analysis envisaged for larger samples.

Rather than arbitrarily choose a single solution, a modal solution was derived independently of the solutions considered previously. The procedure considered the results of the analyses presented in Tables III and IV as well as results from an additional cluster algorithm, Hierarchical Monothetic Division to maximize the reduction in total information at each division (Williams, Lambert, & Lance, 1966; Wishart, 1978). The division tree for this solution is presented in Table V.

The modal solution was derived as follows:

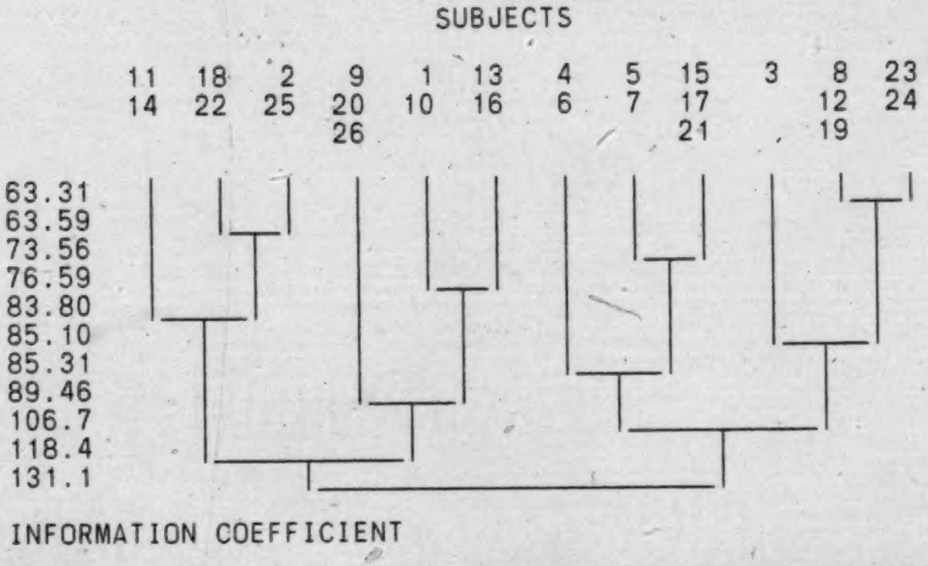
I. Where the clustering for all methods coincided, or where two methods coincided and the third varied by at most one member, the cluster was considered stable and was interpreted.

This criterion resulted in :

a. a cluster containing subjects 5 and 7.
b. a cluster containing subjects 11 and 14.
c. a cluster containing subjects 17 and 21.
d. a cluster containing subjects 9, 20, and 26.
e. a cluster containing subjects 13 and 16.

II. Where the clustering for all methods overlapped but did

TABLE VI DIVISION TREE FOR MONOTHETIC DIVISION METHOD ON INFORMATION COEFFICIENT



not coincide, a grouping was considered a stable cluster if it appeared in at least two solutions and emerged as a unit at a high hierarchical level in at least two solutions.

This resulted in the formation of:

a. a cluster containing subjects 8 and 12 who are clustered together in the Divisive solution and are clustered together early in both Ward solutions.

b. a cluster containing subjects 18 and 22 who are clustered together in the Divisive solution, the

Iterative Relocation solution from a random partition, and who appear in the same clusters in both Ward solutions.

c. a cluster containing subjects 1, 4, 6, 10 and 19. This cluster appears in the Iterative Relocation solution from a Ward partial solution on distances, with the addition of subject 24 in the Ward solution on correlations, without subject 4 in the Ward solution on distances, and as two separate clusters (subjects 1 and 10 and subjects 4 and 6) in the Divisive solution. The decision to include subject 4 in this cluster is based upon his close association to it in most cases, and the lack of any other consistent association in the considered solutions.[16]

In general, the clusters of the modal solution represent lower hierarchical levels of the three cluster solution presented above:

a. Cluster 1 corresponds to cluster 1 in the 3 cluster solution on correlations (with the addition of subject 4 and the deletion of subject 24).

b. Cluster 2 in the 3 cluster solution on correlations contains clusters 2, 3, and 4.

c. Cluster 3 in the 3 cluster solution on correlations contains clusters 5, 6, 7, and 8.

To aid in the interpretation of the clusters, the 53 items of the questionnaire and the scores from 18 factors of the questionnaire were compared for cluster members and noncluster members. (Factor scores were derived from a factor analysis of the structured questionnaire for the subjects of both Experiment I and Experiment II which is reported in detail in Appendix 10.) In reporting differences between the clusters on questionnaire items only those items on which the means differed by more than one standard deviation from the full group will be discussed. [17] It should be reiterated that there is no claim that these differences are statistically significant.

The following reports in detail the interpretation of the modal solution for the cluster analysis of subjects on the full set of constituents. [18]

TABLE VII CLUSTER 1 SUBJECTS 1, 4, 6, 10, 19

FREQUENCY	RATIO [19]	CONSTITUENT
5	2.00	I attribute a momentary state to the man.
5	1.37	I am stuck.
4	3.47	I am thinking about where the man is standing.
4	2.97	Changes reaction or interpretation of the painting as the experience has progressed.
4	2.31	I am uncertain about the expression on the man's face.
4	2.08	The man has a big (long) nose.
4	1.89	I report a change in visual perception (perspective) of the painting.
4	1.73	There is an open door behind the man.
4	1.39	The man looks arrogant.
3	3.12	The artist showed good technique.

3	2.23	I am reflecting on my own thoughts and reactions to the painting.
3	2.23	I am explicitly evaluating the artist's technique.
3	2.23	I am interpreting this painting by trying to tell a story about the man's location, actions and expression.
3	1.95	The man appears rich.
3	1.73	The man seems evil.
3	1.56	There is a window in front of the man.
3	1.42	I have dated the man in the painting.
3	1.30	The man is looking down.
3	1.04	I am thinking about the purpose of the bird.
3	1.04	I am stuck again (for the second time)
3	0.92	I am placing the painting in a temporal context (by era).
2	5.20 *	The man initially looks feminine.
2	5.20 *	The clothing is strange (but not backwards).
2	3.47	I am interpreting the painting as a statement about the psychology of the man.
2	2.60	The bird and the man are facing different directions.
2	2.60	Returns to a topic or reaction previously unresolved.
2	2.60	The man is neat and clean.
2	2.08	The man appears to be actually looking down his nose.
2	2.08	I do not know whether there is a door or a window.
2	2.08	I am interested in the perspective,(the feeling of depth and how it is created).
2	2.08	I wonder what he's thinking.
2	2.08	The man is closed (resisting).
2	2.08	I am considering the red portion of the painting as a color characteristic of the painting.
2	1.49	I don't like the man.
2	1.49	The painting is from the 16-17 century.
2	1.49	The man has just come in.
2	1.30	There is a perceptual ambiguity in the painting.
2	1.30	I didn't notice the bird immediately.
2	1.30	I see expressive/emotional characteristics in objective features of the painting (not the face).
2	1.04	The bird blends into the man's sleeve.
2	0.80	I attribute an enduring trait to the man.
2	0.80	I don't know the purpose of the bird.

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* Constituents marked by an asterisk denote constituents which appeared only in the cluster under consideration.

The experiences of the subjects of this cluster were changeable (Changes reaction or interpretation of the painting as the experience progresses, I report a change in visual perception or perspective in the painting, I didn't notice the bird immediately, Returns to a topic or reaction previously unresolved), apparently because of a sensitivity to ambiguity and a set that strives for its elimination. Sensitivity to ambiguity is moderated by constituents which describe interpretive uncertainties (I am uncertain about the expression on the man's face, I am thinking about the purpose of the bird, I wonder what he's thinking, I am reflecting on my own thoughts and reactions to the painting) and perceptual uncertainties (There is a perceptual ambiguity in the painting, I do not know whether there is a door or a window, the clothing is strange). These subjects' motivation to eliminate these ambiguities is suggested by lower scores on the structured questionnaire item 45 (I tried to be as precise and systematic as possible while experiencing the painting). This interpretation is reinforced by re-examining these subjects' original protocols. They generally began by noting an ambiguity, continued by offering an interpretation of it, and then moved to another ambiguity, offering a new interpretation or modifying the previous one. New ambiguities sometimes arose suddenly; sometimes so did their resolution (Subject 1 Units 15 and 16 provides a prime example).

The interpretations offered by these subjects were in some cases attempts to resolve their previously referred to interpretative uncertainties. Generally, their interpretations of content were of two types (I am interpreting the painting as a statement about the psychology of the man; I am interpreting the painting by trying to tell a story about the man's location, actions, and expression). Those who favored the first type of explanation tended to focus on the man's face (I am uncertain about the expression on the man's face, I wonder what he is thinking); those who used the second type employed, in addition, information about the location of the man (The man has just come in, There is an open door behind him, I am thinking about where he is standing, The man is looking down). Some psychological interpretations were shared (The man seems evil, The man is closed or resisting). In one case the story conclusion was that the man was being reprimanded. It should be noted that both these forms of interpretation focus on a short term time frame (I attribute a momentary state to the man) and in no case was the interpretation firmly offered that the painting was a portrait designed to show the enduring character traits of the figure. (A qualification of this assertion is necessary since most thought the man to be arrogant.)

Just as the preceding interpretations correspond to these subject's acknowledged uncertainties, their comments about perceptual features of the painting correspond to their acknowledged perceptual uncertainties. Specifically, they reported examining the painting's perspective (I am interested in the perspective, the feeling of depth and how it is created), and usually their conclusions were similar (There is an open door behind the man, There is a window in front of the man).

In summary, subjects in this cluster reported changes in their perceptions and interpretations, apparently in response to ambiguities and uncertainties they were motivated to resolve. Their attempts to resolve these uncertainties included content interpretations that emphasize momentary states rather than traits of the figure and perceptual reconstructions that clarify the painting's perspective.

This cluster is very similar to the first cluster of the three cluster solution (subject 4 is added, subject 24 deleted). The constituents considered here are basically the constituents considered in the discussion of that cluster, with the exception that all items associated with the cluster are considered rather than solely those which differentiate the cluster from others. The more elaborate interpretation offered here seems coherent and effective; it suggests many hypotheses for future investigation.

TABLE VIII CLUSTER 2 SUBJECTS 18, 22

FREQUENCY	RATIO	CONSTITUENT
2	6.50	The man is neat and clean.
2	4.33	I note the blue of the background (sky).
2	4.33	The bird contrasts with the man in the painting.
2	4.33	The painting has many straight lines.
2	3.71	The man appears religious.
2	3.25	I see expressive/emotional characteristics in objective features of the painting (not the face).
2	3.25	The red of his clothes is bright.
2	3.25	I am stuck again (for the third time).
2	2.60	Moves from aspect to aspect without returning in unorganised, jumpy, descriptive manner.
2	2.60	There is a window in front of the man.
2	2.17	I note contrast in the painting.
2	2.00	I attribute a momentary state to the man.
2	2.00	I don't know the purpose of the bird.
2	1.73	I am thinking about the purpose of the bird.
2	1.73	I am stuck again (for the second time)
2	1.53	I am placing the painting in a temporal context (by era).
2	1.37	I am stuck.

These subjects' membership in the second cluster of the 3 cluster solution is indicated by their lack of focus and the ease with which they became stuck (I am stuck for the third time, Moves from aspect to aspect in unorganised manner), although the interpretation of these features is given a distinctive slant by the additional constituents specific to the pair.

First, consistent with the prior clustering, these subjects do focus on the formal characteristics of the painting (The painting has many straight lines, The red of his clothes is bright, I note the blue of the sky). And some idiosyncratic statements echo this theme. For example, one or the other also notes the dim background, the black hair, the white collar, and the brown sleeves. But this orientation toward formal characteristics appears to reflect a broader interest in producing art and a greater degree of art education (Factor 12) than is present in other subjects, an interpretation bolstered by their sensitivity to contrast within the painting (I note contrast in the painting, The bird contrasts with the man) both at a perceptual and an interpretive level. Examination of the original protocols revealed that even the constituent concerned with emotional characteristics (I see expressive/emotional characteristics in objective features of the painting) was based on this sensitivity to contrast. Specifically, subject 18 contrasted the cold of the wall with the warmth of the window in an attempt to interpret the figure's character and subject 22 contrasted the happy expression of the bird with the sad expression of the man.

Furthermore, the subjects' style of reporting takes additional significance here since it appears to contrast with their stated concern for systematic and precise reporting, their concern for how well they were doing, and their belief that the experience could be captured in words

(Factor 11). These subjects also stated on the questionnaire that they found the painting simple and yet difficult to recall (Factor 13), a pattern that is analogous to their reports of being stuck even while believing that the experience is readily verbalized. One interpretation of these apparent incongruities arises from the convergence of two additional constituents (The man is neat and clean, The man appears religious). The transcript of subject 22 in particular suggests that these aspects are focused upon, along with the specific features of color and line as discussed above, and fused to create an aura of 'primness' and perhaps simplicity about the picture. It may be that the search for order and precision placed severe constraints on what these subjects were willing to report. This interpretation is consistent with their faltering style and with the brevity of their reports.[20]

In summary, these subjects showed a faltering and unfocused reporting style that may reflect extraordinary (and futile) striving for simplicity and concreteness. This striving may reflect experiences with art education that has sensitized these persons to form and contrast in paintings such as this.

TABLE IX CLUSTER 3 SUBJECTS 8, 12

FREQUENCY	RATIO	CONSTITUENT
2	13.00 *	The man appears to be in the army.
2	8.67	The man's clothes are trimmed with fur.
2	3.71	I am interpreting this painting by trying to tell a story about the man's location, actions and expression.
2	3.71	Reports or interprets further aspects consistently in light of initial reaction.
2	2.89	The man seems evil.
2	2.17	I note contrast in the painting.
2	2.17	The man is looking down.
2	2.00	I attribute an enduring trait to the man.
2	1.73	I am stuck again (for the second time)
2	1.53	I am placing the painting in a temporal context (by era).
2	1.37	I am stuck.

These subjects' membership in the second cluster of the 3 cluster solution indicates a quite different meaning to the constituents that led to their inclusion in that more abstract cluster. Their faltering reporting style (I am stuck, I am stuck for the second time) seems incidental and unrelated to strivings for simplicity as was the case for the previous subjects. Instead, it seems related to the fact that these subjects reported that they were unlikely to engage in self-reflection and do not appreciate art (Factor 3).

As well, these subjects do *not* lack a focus. Rather, they elaborate a single interpretation (Report or interpret further aspects consistently in light of initial reaction). For example in the protocol of subject 8, the presence of the fur on the man's sleeves confirms an earlier interpretation that the man was a hunter. These subjects' interpretations are storied ones (I am interpreting this painting by trying to tell a story about the man's location, actions and expression, The man is in the army, I am placing the painting in a temporal context by era) in which, unlike the interpretations offered by the subjects of cluster 1, traits rather than temporary states are attributed to the character (I attribute an enduring trait to the man, The man seems evil). This consistency and straightforwardness parallels their questionnaire ratings of the painting as balanced, orderly and clear (Factor 6) and realistic (Factor 15). [21]

TABLE X CLUSTER 4 SUBJECTS 11, 14

FREQUENCY	RATIO	CONSTITUENT
2	6.50	The figure fills the picture.
2	6.50	The person looks unreal.
2	5.20	I don't like the painting.
2	5.20	The man appears to be actually looking down his nose.
2	5.20	The painting is unrealistic.
2	4.33	The man's eyes are almost closed.
2	4.33	The painting is a portrait.
2	4.33	The painting is simple.
2	3.71	The painting is from the 16-17 century.
2	3.25	There is a line in the man's forehead.
2	3.25	I am stuck again (for the third time).
2	2.89	The painting is strange.
2	2.89	The painting fits a style.
2	2.60	The man has a big (long) nose.
2	2.60	Moves from aspect to aspect without returning in unorganised, jumpy, descriptive manner.
2	2.00	I don't know the purpose of the bird.
2	1.73	I am thinking about the purpose of the bird.
2	1.73	I am stuck again (for the second time)
2	1.53	I am placing the painting in a temporal context (by era).
2	1.37	I am stuck.

These subjects again contrast with the other members of cluster 2 of the 3 cluster solution. Again their dysfluencies of reporting (Move from aspect to aspect without returning in an organised manner, I am stuck for the third time) seem unrelated to striving for simplicity, rather they seem related to a fairly intense dislike of the painting (Factor 10) and their reaction that the painting was strange and unrealistic (The person looks unreal; the painting is strange). Unlike the subjects in the previous clusters, these subjects date and type the picture (The painting is from the 16-17 century, The painting is a portrait) and find the painting simple, but offer no further interpretation. Except for some curiosity about the bird (I don't know the purpose of the bird, I am thinking about the purpose of the bird), the majority of their experience seems limited to concrete descriptions of the appearance of the character (The figure fills the picture, The man has a big nose, The man appears to be looking down his nose, The man's eyes are almost closed, There is a line in the man's forehead). Not surprisingly, these subjects found the experience depressing (Questionnaire item 4) and not easy to recall (Item 34.)

In summary, these subjects were quite disorganised in their reported experience, found the painting strange, and explicitly stated their dislike of it. Their reports are devoid of content interpretations and curiosity about the ambiguities in the painting.

It should be noted that the constituents concerned with strangeness shared by these subjects make them similar to the members of the third cluster in the 3 cluster solution, a fact reflected both by their inconsistent associations with other subjects in the Wards solutions presented in Tables III and IV and by their proximity by distance to the centroid of the third cluster.

TABLE XI CLUSTER 5 SUBJECTS 5, 7

FREQUENCY	RATIO	CONSTITUENT
2	6.50	The painting is odd.
2	5.20	I am considering the artist's perspective and/or sensibilities (independently of his ability).
2	3.25	I didn't notice the bird immediately.
2	2.89	The painting is strange.
2	2.89	The striking red is the first thing you see.
2	2.89	The painting fits a style.
2	2.60	The bird blends into the man's sleeve.
2	2.36	I report a change in visual perception (perspective) of the painting.
2	2.17	The man is looking down.
2	2.17	There is an open door behind the man.
2	1.73	The man looks arrogant.

This pair of subjects clearly share one of the distinguishing characteristics of membership in the third cluster of the 3 cluster solution, that of believing the painting strange (The painting is strange, The painting is odd). The other distinguishing characteristic of membership, sensitivity to color, seems represented here by a tendency to be surprised by perceptual characteristics of the painting that range beyond color sensitivity (The striking red is the first thing you see, I didn't notice the bird immediately, Reports a change in visual perspective). Along the same line, their repeated references to the arrogance of the figure in their original protocols suggest that they were particularly struck by that arrogance. Perhaps these oddities and surprises led them to be quizzical about the artist (I am considering the artist's perspective and/or sensibilities).

These subjects do share the following differences from the group on the questionnaire:

a. The judgement that the experience was not emotional, nor personally helpful (Factor 8).

b. The judgement that the experience did not open new alternatives for exploration (Item 47).

c. An interest in drawing and viewing art (Items 49 and 50)

d. A discounting of the importance of color, light, and arrangement of elements to their perception (Factor 1).

With the exception of c, these differences seem at least compatible with the befuddlement expressed by these subjects in their protocols.[22]

TABLE XII CLUSTER 6 SUBJECTS 17, 21

FREQUENCY	RATIO	CONSTITUENT
2	6.50	The painting seems cold.
2	6.50	The painting is a portrait influenced by the patron.
2	6.50	The branch on which the bird sits is unusual.
2	5.20	The facial features are strange.
2	5.20	The painting is unrealistic.
2	4.33	The painting is a portrait.
2	3.71	I don't like the man.
2	3.25	The clothes are on backwards.
2	2.89	The painting fits a style.
2	2.89	The painting is strange.
2	2.36	I report a change in visual perception (perspective) of the painting.

The subjects of this cluster also felt that the painting was strange (The painting is strange, The painting is unrealistic). In fact, they carefully enumerated the details that led to this impression (The clothes are on backwards, The facial features are strange, The branch on which the bird sits is unusual). Both also expressed dislike for the painting (The painting seems cold, I don't like the man). Finally, they provided some comments about the type of painting they believed it to be (The painting is a portrait, The painting fits a style) and went on to speculate upon the motivation of the artist in painting it (The painting is a portrait influenced by the patron). These subjects did not share the sensitivity to color characteristic of other members of the third cluster of the 3 cluster solution.

This rather remote style of approaching the painting contrasts with their responses to the questionnaire:

a. Both subjects characterised themselves as introspectors with experience in meditation, interest in viewing art, and vivid internal experiences (Factor 3).

b. Both had education in art and enjoyed drawing (Factor 12).

c. Both thought the experience to be emotionally draining and personally helpful (Factor 8) and found the experience interesting (Item 5).

d. Both thought that the painting showed tension and that the artist was concerned with conflict (Factor 4).

These questionnaire responses are not, however, incompatible with some comments made by these subjects that were insufficiently similar to be designated as constituents. Both of these subjects' original protocols include musings about their reactions to the experimental setting and task. This feature of their protocols suggests a reflective involvement in the task that confirms some of their questionnaire ratings and suggests that the constituent analysis did not capture important features of their experience.

TABLE XIII CLUSTER 7 SUBJECTS 9, 20, 26

FREQUENCY	RATIO	CONSTITUENT
3	3.71	I am considering the color characteristics of the painting.
3	2.89	The striking red is the first thing you see.
3	2.89	The painting is strange.
3	2.00	I don't know the purpose of the bird.
3	1.73	I am thinking about the purpose of the bird.
3	1.73	The man looks arrogant.
2	5.78	My attention is drawn to central figure.
2	4.33	The facial area is painted with good technique.
2	4.33	The painting is odd.
2	3.47	The facial features are strange.
2	3.47	The bird is a symbol.
2	3.47	The background of the painting is dim.
2	2.48	I am reflecting on my own thoughts and reactions to the painting.
2	2.48	I am explicitly evaluating the artist's technique.
2	2.17	The artist had a purpose in painting this picture.
2	2.17	The red of his clothes is bright.
2	1.44	I note contrast in the painting.

The members of this cluster seem clearly to reflect the major characteristics of the third cluster of the 3 cluster solution; they find the painting strange (The painting is strange, The painting is odd, The facial features are strange) and they focus attention upon color characteristics (I am considering the color characteristics of the painting, The striking red is the first thing you see, The background of the painting is dim, The red of his clothes is bright).

This sensitivity seems related both to contrast (I note contrast in the painting) and to the direction and redirection of attention (My attention is drawn to the central figure). They also focus upon their own experience (I am reflecting on my own thoughts and reactions to the painting) and upon the subjective meanings of certain symbolism (The bird is a symbol). In addition, these subjects evaluate the painting (I am explicitly evaluating the artist's technique, The facial area is drawn with good technique).

It is perhaps noteworthy that these subjects do not report becoming stuck during their description of their experience. It is as if these subjects were able to report a full range of experiences, including technical and symbolic features of the painting and their evaluations without becoming stuck. These subjects' attendence to their own experience along with their attempt to be precise and systematic in reporting their experiences and belief in the ability of words to capture them (Factor 11), and their report that the experience was emotionally draining and personally helpful (Factor 8), leads to the interesting speculation that they were most able to follow the instructions for the experiment (and were thus most able to participate emotionally in it). [23]

TABLE XIV CLUSTER 8 SUBJECTS 13, 16

FREQUENCY	RATIO	CONSTITUENT
2	13.00 *	I note the brown of the background structure.
2	6.50	Comments about structural technical aspects of the painting as a whole in an analytic manner.
2	6.50	I note the black of his hair.
2	6.50	The painting contains its own frame.
2	5.20	The setting is medieval.
2	4.33	I notice color contrast in the painting.
2	3.25	There is a perceptual ambiguity in the painting.
2	2.60	The bird blends into the man's sleeve.
2	2.36	I have dated the man in the painting.
2	2.17	I note contrast in the painting.
2	2.17	The man is looking down.
2	2.17	There is an open door behind the man.
2	2.00	I don't know the purpose of the bird.
2	1.73	I am thinking about the purpose of the bird.
2	1.53	I am placing the painting in a temporal context (by era).

These subjects, in contrast to the other subjects in the third cluster of the 3 cluster solution, do not find the painting strange or odd. Their principal similarity to other members of cluster 3 appears to be their sensitivity to color. In fact, the status of this pair as an outlier group is reinforced by their inconsistent group memberships in the two Ward solutions and by their distance from the cluster centroid of the third cluster in the 3 cluster solution.

Both subjects in this partition engage in a considered, organised, complete description of one or more aspects of the painting. Subject 13 considers color and texture, while subject 16 considers color and perspective. The analytic attitude of these subjects is also reflected in their discussions of two little noticed descriptive aspects of the painting (I note the brown of the background structure, The painting contains its own frame).

While these subjects also share other constituents, an examination both of the unshared constituents and the transcripts reinforces the impression that the predominant experience that these subjects shared is related to their sharp eye for detail.

The questionnaire responses of this group also seems consistent with their analytic approach to the painting:

a. These subjects tried to be systematic and precise and found the experience easy to describe in words (Factor 11).

b. They found that a clear impression was easy to form (Factor 5).

c. They thought the picture balanced and orderly (Factor 6).

d. They found the painting tranquil and felt the artist to be concerned with harmony (Factor 4).

To summarize the results of the cluster analyses and the relationships between the two solutions presented in detail:

a. The distance matrix between subjects based upon the

133 derived constituents indicates that nonrandom relationships are present among subjects.

b. When clusters are evaluated in terms of greater heterogeneity than would be expected by chance, three interpretable clusters emerge. There is reason to expect that these clusters might be replicable in future investigations.

c. When clusters are evaluated in terms of greater homogeneity than would be expected by chance, and independently of the three cluster solution; 8 clusters emerge. These clusters, while too small to give any confidence of generality, align hierarchically with the 3 larger clusters, and show that, within this sample, the interpretation of constituents of group membership for those 3 larger clusters is tempered by the presence or absence of additional constituents in the 8 smaller clusters.

C. DISCUSSION

This experiment consists of a hierarchy of levels of analysis. At the lowest level, the transcripts of the subjects present a rich set of perceptions, impressions and interpretations even though a substantial proportion of the statements made about the painting seem to be particular to it, and not at all unusual or unexpected (for example, "There is a bird", "He's wearing red clothes").

The reconstruction of the subjects' transcripts by the paraphrases used as constituents occupies the next level of abstraction. Table XV shows the reconstruction of the transcript for Subject 1 using only the constituents which he was judged to have used. They have been placed in order of occurrence to facilitate comparison with the actual transcript. While it is apparent that certain features of this subject's experience have not been captured (for example, 'bumpy nose', 'raised door', 'shameful expression', the specific contents of repetitions etc.), it is also apparent that :

a. the vast majority of meaning units have corresponding constituents,

b. the level of abstraction of the constituents is in most cases low.

The correspondence between the transcript and the reconstruction of it shows in yet another manner the extent of overlap in the responses of subjects to this painting.

The results of the modal cluster analytic solution for

TABLE XV RECONSTRUCTED TRANSCRIPT FOR SUBJECT 1

The person looks unreal.
The facial features are strange.
+ The clothing is strange (but not backwards).
I attribute ethnicity to the man.
The man is from the ancient era.
+ I have dated the man in the painting.
+ I am placing the painting in a temporal context (by era).
*+ I am thinking about where the man is standing.
*+ I am uncertain about the expression on the man's face.
*+ I attribute a momentary state to the man.
The man's eyes are almost closed.
+ I am interested in the perspective, (the feeling of depth and how it is created).
+ There is an open door behind the man.
*+ I am interpreting this painting by trying to tell a story about the man's location, actions and expression.
+ The man has just come in.
The man is being reprimanded (or in court).
+ I am thinking about the purpose of the bird.
+ I don't know the purpose of the bird.
The bird is not unordinary.
*+ The bird and the man are facing different directions.
*+ Changes reaction or interpretation of the painting as the experience has progressed.
+ I report a change in visual perception (perspective) of the painting.
+ There is a window in front of the man.
*+ Returns to a topic or reaction previously unresolved.
+ I wonder what he's thinking.
+ I am stuck.
I am comparing the two pictures that I saw.
*+ I am explicitly evaluating the artist's technique.
*+ The artist showed good technique.
The facial area is painted with good technique.

+ high frequency items for modal solution Cluster 1

* items differentiating 3 cluster solution Cluster 1

subject clusters occupy the next level of abstraction. It was discovered that among *this* set of 26 subjects there are (at least) 8 groups which can be *described* at a level of abstraction beyond the level of the reconstructed transcripts. These groups, however, are not to be viewed as representative of a larger population of subjects, since the size of the groups leads to grave uncertainty about their reliability. Similarly, while it was discovered that a general structured questionnaire shows relationships of an apparently clarifying nature to variables derived from patterns of spontaneous speech, the strength and consistency of these relationships must be explored with a larger sample. Table XV contains symbols to indicate the constituents that showed high frequencies in the cluster to which Subject 1 belonged.

At the next level of analysis is the three cluster solution of subject groups. It provides a picture of the general parameters of the responses of subjects to the painting as well as a small set of items which separate three major groupings. Because of its higher level of abstraction than the modal solution, particularly in relation to the small sample size, it has the best chance of being representative of population differences. Table XV also shows the constituents present in the reconstructed transcript of Subject 1 that are differentially associated with membership in Cluster 1.[24]

The results of these analyses do *suggest* the existence of styles of experiencing art even if they do not offer strong statistical support for them. The subjects of Cluster 1 which is common to both analyses appear to share a style which combines a sensitivity to ambiguity and uncertainty with a set to resolve this ambiguity, sometimes without overall direction or organisation. The subjects of Cluster 2 in the modal solution seek order and precision and do not perceive ambiguity. Similarly, the subjects of Cluster 3 in the modal solution interpret further perceptions consistently in light of an initial storied cognitive framework, again without perceiving ambiguity. Concepts such as these (which are derivable from other clusters as well) are fresh and deserving of further investigation.

Yet this experiment did have shortcomings which suggest that it is most safely interpreted as a demonstration:

a. constituents were produced largely by the author and, though discussed with others, were not subjected to a rigorous analysis for reliability. [25]

b. the small sample size makes the generalizability of the results doubtful even if it is judged that the actual similarity in this sample has been adequately represented.

To summarize, this experiment has suggested that it is possible to derive variables from spontaneous speech and code them in a manner that allows their manipulation by current analytic methods, while still maintaining a meaningful representation of the original speech. It has also suggested the possibility of creating clusters of subjects who share, at minimum, a commonality of speech and, at maximum, a style of experiencing; although problems with coding reliability and particularly with sample size do not allow a stronger conclusion. It has hinted that there may be relationships between the variables that the methodology derives and those derived by traditional psychometric methods. It has hinted that the methodology may aid the formation of fresh theoretical concepts.

D. DIRECTIONS FOR THE METHODOLOGY

The major obstacles to the continued development of the current methodology are related to the amount of information necessary for its effective utilisation. The most profound uncertainty will remain in the ability of the individual experimenter to assimilate the necessary masses of information for purposes of deriving and coding similarity, of checking results against expectations, and of establishing the reliability of the constituent construction process. The directions for alleviation of this problem seem to lie in two directions :

a. the restriction of information utilised; and
b. the development of automated means for the treatment of data.

This experiment focused upon the explicitly reported experiences of subjects, but the high proportion of descriptive statements in subjects' transcripts suggests that the instructions to focus upon experience were not totally successful. If the time allowed for viewing the painting had been increased, it is doubtful that much additional useful information would have been obtained in view of the large number of subjects who became stuck more than once. One possibility for increasing the proportion of information that is explicitly grounded in experience is the use, in similar experiments, of subjects who have been more extensively trained in the art of attending to and reporting on their experience. On the other hand, it seems possible that too much time was allotted in the current experiment for reporting experience since a substantial number of subjects became and remained stuck. Others 'searched' for things to say because they thought this a demand characteristic of the situation. Indeed, the structure of clusters of subjects in this type of experiment might be clearer if only initial reports (and hopefully therefore dominant experiences) are utilised in analysis.

Another alternative would be to allow subjects to write rather than speak about their experiences. This has the advantage of the self-editing and organising powers of subjects' intellects, but it is questionable whether the domain of study would remain the same (though this is not necessarily a drawback). Along this same line is the use of a variety of structuring techniques such as open-ended questionnaire materials, or preselected questions, and these techniques might be profitably used to augment spontaneous verbalisations particularly if derived over the course of continued research in the same domain.

The other potential direction for handling the problem of the amount of information required in any large scale application is the increased development and use of automatic data processing. One alternative that the author is currently exploring is the use of a string processing program ANALYZE to begin the work of sorting meaning units for similarity. This program will have two phases :

a. The first phase will output a list of words and frequency counts to the experimenter who will be required to search the list for variations on the same word (e.g. unreal and unrealistic) and synonyms (e.g. hot and stiffling). He will then reenter the list to be used as a dictionary.

b. The second phase will construct a matrix of matches between meaning units based upon the number of shared words, and cluster the resultant matrix before outputting a set of lists of similar meaning units. [26]

III. EXPERIMENT II

The purpose of Experiment II was to determine the extent to which the results obtained from Experiment I could be replicated and extended by using a short questionnaire in a group administration in place of the procedure of Experiment I. The strategy was:

a. to derive a questionnaire from the constituents discovered in Experiment I.
b. to administer this questionnaire under conditions closely approximating the conditions of Experiment I.
c. to derive subject clusters from the questionnaire responses.
d. to compare the clusters obtained across the two experiments.

If these clusters proved to be similar, then future experiments in this domain could be considerably simplified.

A. METHOD

Subjects

Subjects were 110 students from introductory psychology classes at the University of Alberta. Subjects participated in this experiment in groups of between 8 and 10 to fulfill course requirements.

Procedure

Subjects were met at the door of the experiment room and directed to two tables at the back of the room. The experimenter requested that the subjects be seated and become comfortable.

The experimenter then explained that it was important for the subjects to remain relaxed for the remainder of the session and conducted a standardized relaxation procedure identical to the one used in Experiment I.

At this point, the experimenter read from a prepared script which:

a. explained that the subjects would later be requested to experience a painting while trying to focus their full attention upon the particulars of that experience; and

b. demonstrated this style of experiencing. (This demonstration was also identical to the one used in Experiment I.)

The script (including the relaxation procedure) is included as Appendix 6.

The subjects were shown a practise picture during the demonstration. It was projected onto a rear projection screen positioned approximately four feet in front of the subjects and raised to approximately four and a half feet. The room was darkened. The subjects were then shown the test picture, which was the same picture used for Experiment I, and asked to attend to their experiences for four minutes.

At the end of this time, the subjects were asked to complete a questionnaire consisting of statements derived from the verbal responses of subjects from Experiment I. Subjects were asked to mark the category 'yes' on the questionnaire if a statement accurately reflected an experience that they had had while viewing the painting; and to mark the category 'no' if it did not. Because of the importance of these instructions, they were both read to the subjects and placed at the top of the questionnaire. The questionnaire and the instructions are contained in Appendix 7.

After they had completed the constituent questionnaire, subjects were requested to complete the same structured questionnaire that had been used in Experiment I. Finally, the subjects were debriefed according to a standard procedure which is included as Appendix 8.

Constituent Questionnaire

The items for the constituent questionnaire were chosen directly from the transcripts of the subjects of Experiment I. The items represent a random sample from these transcripts subject to the following constraints :

a. that the item be short and easily derived from the corresponding meaning unit with minimal rewording or correction.

b. that the item refer primarily to experience (for example, 'The person looks very closed') rather than to objective characteristics of the painting (for example 'The sky in the background is blue').

c. that the item be general enough to prevent its rejection on the basis of a single word or idiosyncratic expression.

d. that the item differ from items already chosen.

These constraints eliminated two important types of meaning unit from consideration:

a. those with extensive explanations about the particulars of experience, and

b. those with two separate juxtaposed ideas.

This strategy produced a number of items that overlapped the items of the structured questionnaire. It was thought, however, that the emphasis placed on the instructions, and the fact that the questionnaire was administered immediately would insure that responses would reflect experiences felt by the subject rather than judgements made upon reflection.

B. ANALYSIS AND RESULTS

The same clustering algorithms used in Experiment I were applied to subject by subject similarity matrices derived from the questionnaire responses. These were:

a. The Ward method on Euclidean distances and on correlations.

b. Iterative Relocation from Ward partial solutions and from random initial partitions.

c. Monothetic Division to maximize the reduction in information.

When these methods did not provide comparable clusters, the following additional methods were used:

a. Mode and Density analyses (Wishart, 1978) which attempt to form clusters on the basis of the average density of each point (as calculated from nearest neighbor lists).

b. Complete and Average Linkage clustering (Sneath & Sokal, 1973) on both correlations and Euclidean distances.

In no case did the relationship between the emergent clusters show significant communality across methods. The Mode analysis indicated the presence of only one cluster. The Density analysis showed two. Of the remainder, the Average method Linkage showed the highest cophenetic correlation (Sneath & Sokal, 1973), which measures the extent to which the cluster solution reproduces the original similarity matrix, but this method produced an excessive amount of chaining.[27]

Two properties of the data seem responsible for the failure of these conventional methods in the analysis of the constituent questionnaire:

a. The questionnaire does not possess a strong covariance structure as indicated by the fact that the first eigenvector of the item correlation matrix accounts for only 8.3% of the total variance, and the first 25 eigenvectors account for only 74.5%.

b. The widely varying acquiesence frequencies of the items make a stable estimate of both the similarity between subjects and the similarity between variables difficult to discover. Both the phi correlation coefficent and Euclidean distance and its variants will tend to consider data objects with similar total response frequencies more similar on average, particularly if these totals are extreme.

The failure of conventional methods to produce stable clusters of the current data set should not necessarily be taken as evidence of the failure of Experiment II. It may the case that the structure of the data matrix can be represented by methods which allow the formation of overlapping clusters. This possibility is explored with some success in Appendix 11.

An independent analysis to assess the success of Experiment II in reproducing the conditions of Experiment I, however, suggested that the two experiments were not comparable. This analysis compared the responses on the structured questionnaire of the subjects in Experiment I with the responses of the subjects in Experiment II.

Recall that responses to the structured questionnaire had been factor analysed for the subjects of both experiments as reported in Appendix 10. Subsequently, a stepwise discriminant function analysis (Sanathanan, 1975) was performed on the resulting 18 factors of the structured questionnaire. Six of the eighteen factors (numbers 5,6,10,11,14 and 17) met the inclusion criterion for the equation to separate the subjects of the two experiments (a significance level of 0.05), and the Mahalanobis distance between the two groups based on this optimal equation was significant (F=6.89, $p<0.0001$). The Kruskal-Wallis nonparametric test for equality of distributions (Siegal, 1956) was significant at the 0.05 level for three factors (numbers 5,11 and 17). These factors fall naturally into two groups; one concerned with the experience as a whole and the other concerned with characteristics of the painting. The subjects from Experiment I scored higher on items indicating that they:

a. became more involved in the experience, were more aware of themselves after the experience, felt a loss of distance from the painting, and felt that the experience opened new alternatives (Factor 5)
b. tried to be systematic and precise during the experience, felt that words adequately captured their experience, worried about their performance during the experiment, and could still 'see' the painting (Factor 11)
c. felt that the painting was powerful and heavy (Factor 17)
d. felt that the experience was colorful and the painting was beautiful, rich and clear (Factor 10)
e. felt that the painting was balanced, orderly and clear (Factor 6)
f: felt that the artists imagination and emotions were important (Factor 14)

C. DISCUSSION AND CONCLUSIONS

Two conclusions emerge from Experiment II:

a. there are important differences between Experiments I and II that cast doubt upon the interchangeability of the procedures of Experiment II and those of Experiment I.

b. Either the procedures of this experiment do not result in data with analyzable structure, or conventional methodologies do not display the structure of the data in the degree of complexity required for meaningful results to emerge.

Because of the nature of the differences that occurred on the structured questionnaire between subjects in the two experiments, it seems doubtful that a form of mass data collection such as employed in this experiment will allow subjects to report the same types of experience that they would have had in the context of Experiment I. If the experiment were to be repeated as a group experience, every conceivable attempt would have to be made to engage the cooperation of the subjects in participating, both because that quality of the overall experience seemed to be missing from the subjects of Experiment II, and because it appeared to have substantive implications for their judgements about the stimulus used. On the other hand, the procedure of Experiment I appeared to cause those subjects to be more worried about their performance and (possibily) rigid about the degree of censorship that they excercised in reporting their experiences. As has been previously suggested, the use of trained subjects might alleviate these effects in the procedure of Experiment I; the same might be true of the procedure of Experiment II.

The fact that the frequencies of assent to the items of the constituent questionnaire were larger than might have been expected on the basis of the frequencies observed in spontaneous speech in Experiment I might have been due to:

a. the inability of the subjects of Experiment I to report all of their relevant experiences,

b. the operation of the reflective powers of the subjects of Experiment II in judging the plausibility of the statements in light of their experiences rather than (as instructed) the spontaneous occurrence of these experiences.

A more detailed examination of these alternatives will await experiments that combine the two methods of data collection.

On the surface, this experiment suggests that there is no meaningful structure in the responses of subjects to the constituent questionnaire. However, while the capabilities of complex multivariate techniques to dissect data are often awesome, the failure of these techniques need not force the acceptance of the null hypothesis of no structure. The exploratory analysis reported in Appendix 11 supports the alternate contention that these methodologies are inadequate to the task of locating structure in this case; that they do not adequately represent the data's complexity. Furthermore, in any large scale application, the procedures of Experiment I seem likely to yield data that share with the current data the properties of extreme item acquiesence frequencies, and covariance structures approaching orthogonality. This makes it even more important to continue to develop methods such as overlapping clustering which will be sensitive to the fine structure of this data.

IV. SUMMARY AND CONCLUSIONS

Recall that the methodology demonstrated in this thesis:

a. sought to develop concepts about the subjective experience of individuals that would reflect the complexity of this experience by replacing the definition of such concepts in terms of necessary and sufficient conditions with polytypic definitions which rely upon the frequency of occurrence of a variety of symptomatic variables.

b. relies upon incompletely specified measurements of hypothesized polytypic concepts, but relies also upon a concept formation strategy associated with a developing statistical methodology utilizable in investigations both similar to and different from the current one.

The investigation undertaken to investigate this methodology did not reveal a global conception of experience in response to the presented painting that meets the criteria of a fundemental structure as proposed by phenomenological psychologists (for example, Collaizzi, 1978); that is, a conception that relies upon necessary and sufficient conditions. To produce such a structure of experience, with the generality presumed by the word fundemental, would require reported experiences of more than a single painting under more than a single set of conditions. However, a generalized response did emerge in the three cluster solution in Experiment I. It was based upon constituents that did not differentiate between these three groups, but which were also not present in the protocols of *all* subjects. Thus the generalised response is a polytypic concept; its form contrasts with the form of fundemental structures.

It should be noted that all of the concepts of types of experience that did arise in Experiment I are not, strictly speaking, polytypic. That is, in the specification of the clusters of subjects, a number of constituents were present in the transcripts of all subjects of a given cluster (making them, in retrospect, necessary for the assignment of these individuals to the cluster), and a number of constituents were present only within the transcripts of subjects assigned to a particular cluster (making them sufficient conditions).[28] It is important to understand, however, that this feature is not an intrinsic property of the method, but a manifestation of its application to the current small sample. That is, the methods of cluster analysis rely, for the assignment of an individual object to a cluster, not upon the frequencies of occurrence of particular properties, but upon a complex function of the frequency of occurrence of *all* properties that are present in the object, that is, a preselected measure of global similarity. Thus an object that did *not* manifest a property that, to that point, had been present in all members of the cluster, would nevertheless be assigned to the cluster if it shared a sufficient number of *other* properties with the current members of the group. The small size of the sample used in the experiment reported here did not allow this property of the method to become manifest.

The concepts that did arise, however, should be easy to subject to further investigation since a focus in the current investigation was the potential replicability of the procedures at each stage in the specification of these concepts. This potential seems lacking from the concepts derived by the methods of phenomenological psychologists as evidenced by the lack of research that attempts to further examine the concepts resulting from such investigations. In large part, this inability to further utilize the concepts of experience derived by phenomenological psychologists must be attributed to lack of precision and completeness in the published accounts of their methods.

In addition to research designed to replicate the concepts derived from the current research with a larger sample of subjects, investigation to examine the degree to which these concepts transcend the particular painting which evoked them is possible. For example, collection of the reported experiences of subjects to a set of paintings differing in compositional features would indicate the extent to which concepts of experience derived by the current methodology are influenced both by the particular characteristics of particular paintings and by the particular characteristics of the individual who experiences them. As well, since the flow of experience is intrinsically temporal, extensions of the current method could be designed to examine the importance of the order inherent in reports of experience.

Examination of the concepts derived from this type of investigation could also proceed in a manner designed to extend the richness and subtlety of the concepts, a process called *construct validation* (Cronbach & Meehl, 1955). The measurement of additional variables in conjunction with the collection of reports of experience would be expected to demonstrate not only the relationship of reported experience to traditional psychological variables but also to provide insight into the additional unconsidered aspects of experience. The research reported here has pointed to the utility of this approach by suggesting relationships between items of a structured questionnaire and the constituents that formed derived polytypic concepts.

Additionally, if concepts can be precisely derived from reported experience, the possibility exists for deriving alternative procedures for the measurement of these concepts that will be more sensitive to the subtleties of experience than are traditional measurement procedures. However, these techniques will need to be more sophisticated than current psychometric methods for developing questionnaires, as was also demonstrated by the current investigation which failed to provide parallels between constituents as derived from reports of experience and these same constituents presented as questionnaire items.

Finally, the development of additional methods of analysis which are sensitive to polytypicality is indicated. This investigation has pointed to one such method, the development of techniques to derive overlapping clusters. Such overlapping clustering methods would not be sensitive solely to the presence or absence of constituents in a report but would be sensitive to the covariation of all constituents considered together. This would provide a rigorous methodology for discovering the cases in which a constituent has a different shade of meaning depending upon the particular context of additional constituents in which it appears.

FOOTNOTES

1 The issues discussed in connection with the present view of methodologies are usually discussed as the problems of observation, measurement, empirical generalisation and concept formation in science (see for example Nagel, 1961; Wallace, 1971).

2 Whether these alternative forms of concept can be effectively utilised in explanation will not be addressed.

3 The painting is on display in the National Gallery of Art in Washington, D.C. It is annotated by the director as follows:

> In looking at portraits one is reminded of something Robert Louis Stevenson once said about Sir Henry Raeburn's work: 'These portraits are racier than many anecdotes and more complete than many a volume of sententious memoirs.' The statement is certainly applicable to Botticelli's portrait of Giuliano de' Medici, the younger brother of Lorenzo the Magnificent. Giuliano was himself a favorite of that circle of poets, artists, and scholars who wrote one of the most glorious pages in the history of Western culture.
>
> All Italy was shocked in 1478 when the twenty-five-year-old prince was stabbed to death in the Cathedral of Florence. This may well have been the most sacriligious murder ever committed, for the conspirators' signal for the onslaught was the bell rung at the elevation of the Host; they knew that at that moment all would bow their heads in reverence. Lorenzo de' Medici was wounded in the neck and escaped, but Giuliano died at the foot of the high altar.
>
> Whether Botticelli painted his friend posthumously or shortly before the murder is disputed. Nor can we be sure of the meaning of the turtle dove perching on a dead branch on the window sill. The symbolism itself is clear: the widowed turtle dove remains faithful to its mate and will alight only on a blighted tree. But does the symbolism apply to Giuliano's passionate devotion to Simonetta Vespucci, one of the most beautiful of all Florentine ladies, who had died two years earlier ? Or is it a symbol of Lorenzo's ceaseless mourning for his brother ? (Walker, 1963, p.84)

4 A full discussion of this questionnaire is contained in Appendix 11.

5 In the line file to which responses were transcribed

meaning units were separated by a line containing a special symbol ('<') and data from a different subject was headed by a line containing another special symbol ('-'). Each meaning unit was limited to 248 or fewer characters in length including blanks and punctuation marks. (This limitation is imposed by the computer facilities used to analyse the data.)

Through the course of analysis, the author was required to write computer programs for the optimal manipulation and display of verbal data. The most important of these programs will be described and source code listings are contained in Appendix 12.

Two computer programs written in the Ratfor language (Kernighan and Plauger, 1976) were constructed to manipulate the transcripts :

- PREPARE - takes the transcripts from the line files as described above, gives a unique subject and sequence number to each meaning unit, and places each meaning unit on a single line.
- DISPLAY - takes a meaning unit as output from PREPARE and places it on consecutive lines of about fifty characters in another line file so it can be easily read and printed.

The purpose of placing each meaning unit on a single line was to facilitate the use of the File Editor (An MTS system program (University of Alberta, 1980)) to isolate meaning units containing similarities; and to facilitate the transfer of such meaning units to other line files organised according to similarity.

6 These computerized techniques included :

a. Using the File Editor to scan for fields containing the same pattern of alphanumeric characters where each field was located on a separate line (in a separate meaning unit) in the transcript file;
b. Processing of the transcripts by a computer program called WORDCOUNT written in SNOBOL4 (Griswold , Poage & Polonsky, 1971) to produce a list of the number of occurrences of each word in the transcript file (as a strategy for discovering patterns of similarity); and
c. Transferring meaning units with similar fields to additional line files for further examination.

7 An acceptable paraphrase was a paraphrase that in the author's judgement would have been accepted by the subject himself. A constituent was judged to have occurred only if the paraphrase was actually contained in or directly implied by a particular meaning unit. If it was thought that the phrase would have required reflection on the part of the subject before acceptance or rejection, it was judged not to have occurred. That is, the attempt was made to restrict the amount of reasoning that would have been required on the

part of the subject to evaluate the acceptability of the paraphrase, particularly with respect to the number of additional premises that would be required to allow the subject to infer the paraphrase from his own words.

8 Such variables where formed were sums of two constituents judged to be included by a hierarchically higher, more general variable. This has the effect of introducing linear dependencies into the data matrix. In large scale studies employing this methodology, this might prove awkward if methods of analysis such as factor analysis seemed desirable.

A different method of handling the problem would be to code a constituent such as 'The painting is strange.' as an occurrance of the constituent 'The painting is odd.' and include only these constituents in the list. This would remove the linear dependency from the data set, but would make location of effects due to 'The painting was odd but not unreal' difficult to recover.

9 Except where specifically noted all analyses used computer programs from the CLUSTAN series (Wishart, 1978) and from the MIDAS series (Fox & Guire, 1976).

10 The computer program for this analysis was written by the author and is available upon request.

11 Despite the fact that all cluster analytic techniques are oriented towards the location of clusters of objects that 'cohere together', the variety of amalgamation rules used to discover this coherence and the variety of metrics available for the expression of similarity suggest that clusters which remain invariant over a variety of methods are inherently more stable than those which are dependent upon a single algorithm (Anderberg, 1973; Everitt, 1974). While this does not obviate the need to analyse the appropriateness of particular metrics and algorithms to the data at hand, it is an appropriate starting point.

12 The iterative relocation method begins with a particular partition and relocates objects between clusters to maximize a criterion. It is a useful adjunct to methods of hierarchical clustering because of the possibility that a member entering a cluster at a low hierarchical level may no longer belong after other members have been added to the cluster (Wishart, 1978).

13 Iterative relocation was identical to the Ward's method solution on distance at and above the solution consisting of eight clusters except for one relocation (subject 24 from cluster 2 to cluster 1). The iterative relocation solution from a random partition collapsed clusters 6 and 7 placing subject 4 with cluster 1 and divided cluster 2 placing subjects 18 and 22 together (Note that clusters are numbered

from left to right as they appear on the dendrogram in Table III prior to the joining at 0.37) For correlations, the iterative relocation solution was identical to the Ward's method solution at levels consisting of 8 or fewer clusters from both a Ward partial solution and a random partition.

14 The criteria for the inclusion of an item in this list were:

a. Each item had a ratio of at minimum 2.50 for within cluster to outside cluster occurrence for at least one cluster.
b. Each item had a frequency of occurrence of at least two in the group associated with its largest ratio.
c. Each item had a significant correlation ($p<0.05$, $r>0.39$) with at least one of the discriminant functions.
d. Each item had a significant correlation with at least one cluster membership dummy variable or a difference in the correlations to two dummy variable in excess of 0.50.

Items failing to meet any of these criteria were placed in the category of nondifferentiating items if the frequency of occurrence of the item in the sample as a whole was at least 5. A large number of items with lower frequencies which also failed to meet the criteria were not considered further. Very few items remained which met one but not all criteria.

It must also be noted that these item groups do not refer to significant *lack of occurrence* of items in clusters.

15 This can be confirmed by examining the means and standard deviations presented above for the simulation of distances by the randomization of individual subject score vectors in conjunction with the joining levels indicated in the dendrograms in Tables III and IV.

16 In addition, all unclustered subjects were examined to discover the basis for their inconsistent associations with a stable cluster. It was discovered that:

a. subject 3 remained unclustered (although the pairing of this subject and subject 26 was examined because of its appearance in the Ward solution on correlations).
b. Subject 23 is exclusively associated with subject 22 at high hierarchical levels in both Ward solutions. However, subjects 18 and 23 do not appear together in the lists of nearest neighbors either for Euclidean distance or for correlations. Consequently the pairing of subjects 22 and 23 was also examined.
c. Subjects 2, 15, and 25 (and perhaps 24) form an inconsistent cluster among themselves appearing in the Ward solution on distances, but appearing in widely separated partitions in the Ward method on correlations and the Divisive solution. Examination

of the constituents of these subjects showed that they said little, became easily stuck, and lacked organisation. It is this low frequency of response that leads to their association in methods using Euclidean distance, but where the measure of similarity is less sensitive to frequency, the association fragments. What these subjects did say thus led to their inclusion in other clusters. They will not be considered further.

The interpretation of clusters containing subjects 3 and 26 and containing subjects 22 and 23 will appear in footnotes to the following.

The existence of inconsistent clustering (especially involving subjects 3; subjects 18,22, and 23; and subjects 2,15,24, and 25) suggests that the formation of clusters by traditional methods may not adequately represent the similarity in the data matrix. It should be noted that the methods used here all derive exclusive clusters, whereas the inconsistencies in locating some subjects suggests that overlapping clusters may be present in the data. The development of methods for producing overlapping clusters (where subjects are not exclusively associated to a single cluster) is one direction for removing these inconsistencies.

17 This difference corresponds to a distance larger than 2 points (and often larger than 3 points) on the nine point scale. As well, these items will be reported only if the responses were extreme. In reporting differences between factors, the same convention will be followed; that is, the factor score differs by one standard deviation or more from the group average.

18 Interpretation of clusters by subject was simplified by a computer program written by the author:

a. LOOK.PART takes as input the members of a partition of subjects and outputs the full listing of constituents for this partition ordered by frequency.

The source code for this program is presented in Appendix 12.

19 The ratio presented is well established and is defined as the ratio of the frequency of the constituent within the cluster to the overall frequency of the constituent within the subject group as a whole. An alternate ratio would be the ratio of the frequency of the constituent within the cluster to the frequency outside the cluster, which would be undefined for constituents completely contained within one cluster. This important case occurred for 4 constituents in the analysis, and these have been represented by a star ('*'). This second ratio, if desired, can be calculated from the information in the table:

RATIO2 = (26 x F x R)/((26 x F) - (S x F x R))

where F is the frequency of the constituent in the cluster;
S is the number of subjects in the cluster; and
R is the presented ratio.

20 The association between subjects 22 and 23 is based upon the tendency to move from aspect to aspect in describing their experiences, an association of the painting to religion, a sensitivity to contrast, a concentration on the starkness of the painting, and perhaps most importantly, the sharing of two low frequency observations (The man has a humorous expression, The picture contains its own frame). Subject 23 is not as oriented to color as are subjects 18 and 22, nor does he use contrast in interpretation. He does share the belief that the painting was simple and not easy to recall (Factor 7) but has no other questionnaire correlates with either subject 18 or subject 22. The unique aspect of subject 23's transcript was his precise description of the asymmetries of the figure's face.

21 The association of this cluster with the previous cluster at low hierarchical levels of the Wards solutions seems to be based less upon shared interpretations than upon concrete shared constituents (The man is looking down, I note contrast in the painting) in addition to the principal constituents of cluster 2 in the 3 cluster solution. For example, the quality of the experience of contrast is strikingly different. For these subjects, the concept is used in passing; for the subjects of the previous cluster contrast is closely related to their interpretation of the painting.

22 An examination of the transcripts also shows, however, that the subjects' reports differed substantially beyond the similarities noted above. Subject 7 in particular seems to be unique, both in the way he uses speech and in his insistence that the painting is abstract and bizarre. Subject 5, on the other hand, gives a detailed and articulate accounting of the aspects of the painting that were striking.

23 An examination of the similarities between subjects 3 and 26 lends doubt to subject 26's proper classification. Subjects 3 and 26 share many of the characteristics concerned with a focus on the direction of attention (The striking red is the first thing you see, I am considering the color characteristics of the painting); they also share a set to interpret the painting consistently as a symbol (I am interpreting the painting as a complex symbol of the artist's and looking for latent meaning, Reports or interprets consistently in light of initial reaction, The author has a purpose in painting the picture, The bird is a symbol, The open door has symbolic significance, The man is closed or resisting); and they do not evaluate the technical aspects of the painting. (With regard to the 3 cluster

solution, the inclusion of subject 3 in the third cluster and the salience of constituents related to symbolism in the differentiation of cluster 3 seem dependent upon this association between subjects 3 and 26). The prinicipal difference between the two subjects (and perhaps the reason that subject 26 is classified with subjects 9 and 20) is that subject 3 is successful and presents an articulate and complete symbolic interpretation while subject 26 is utterly unable to do so.

The two subject groups (9 and 20) and (3 and 26) also showed differences on the questionnaire:

a. Subjects 9 and 20 found the experience to be positive and stimulating (Factor 2).
b. Subjects 3 and 26 found themselves more aware at the conclusion and felt a loss of distance during the experience (Factor 5).
c. Perhaps reflecting the differential importance of symbolism to the members of this group, subjects 9 and 20 found the artist's fantasies and feelings unimportant to their experience while subjects 3 and 26 found these aspects important (Factor 14).

24 While this example suggests the hierarchical nature of the analyses, the fact that Cluster 1 is virtually the same in the two analyses hides the differing bases for classification that would be evident if subject 1 had belonged to a strictly hierarchically contained subgroup in the modal solution.

25 This shortcoming is explained, if not justified, by the amount of preliminary analysis required in the formation of constituents.

26 Enhancements to this basic program could include :

a. the differential weighting of words, or word pairs in the construction of the similarity matrix.
b. the construction of classes (such as color to include all color words)
c. the recognition and tabulation of parts of speech such as adjectives and verbs.

These enhancements move in the direction of traditional content analytic categories and schemes (Holsti, 1969). Other enhancements in the direction of artificial intelligence include :

a. the construction of programmes to understand natural language concepts (Schank, 1972; Winograd, 1972) which may allow automatic sentence parsing and paraphrasing; and perhaps ultimately
b. the direct machine recognition of speech (Wolf, 1976) which may eliminate the need for taperecording and transcribing.

27 A variety of conventional methods also failed to produce stable clusters of variables including:

a. Principal components analysis with varimax rotation.
b. Image factor analysis with orthoblique ('independent cluster') rotation (Harris & Kaiser, 1970)
c. Complete Linkage clustering on correlations (a method advocated as 'discrete factor analysis' by Tryon and Bailey, 1970)
d. Complete linkage on the phi-over-phimax correlation coefficent which is an attempt to compensate for varying item acquiesence frequencies (Rummel, 1970).

28 This is more clerly the case in the clusters derived from the modal solution than in those derived from the 3 cluster solution.

REFERENCES

Anderberg, M. R., **Cluster Analysis for Applications**. New York: Academic Press, 1973.

Arabie, P. & Carroll, J. D., *MAPCLUS:* **A mathematical programming approach to fitting the** *ADCLUS* **model**, *Psychometrika*, 1980, *45*, 211-235.

Ayer, A. J., **Language, Truth, and Logic**. London: Victor Gollanz, 1936.

Baker, W. J. & Derwing, B. L., **Determining the rules children use during language acquisition**. Submitted for publication, 1981.

Beckner, M., **The Biological Way of Thought**. Berkeley: University of California Press, 1968.

Berlyne, D. E., **Studies in the New Experimental Aesthetics: Steps towards an Objective Psychology of Aesthetic Appreciation**. New York: John Wiley and Sons, 1975.

Binswanger, L., *The case of Ellen West*. In R. May, E. Angel, & H. F. Ellenberger (Eds.) **Existence**. New York: Basic Books, 1958.

Boring, E. G., **A History of Experimental Psychology**. New

York: Appleton-Century-Crofts, Inc., 1950.

Boring, E. G., **A history of introspection**. *Psychological Bulletin*, 1953, *50*, 169-189.

Bridgman, P. W., **The Logic of Modern Physics**. New York: Macmillan, 1954.

Colaizzi, P. F., *The descriptive methods and the types of subject-matter of a phenomenologically based psychology: Exemplified by the phenomenon of learning, Unpublished Ph. D. thesis*, Duquesne University, 1969.

Colaizzi, P. F., *Psychological Research as the phenomenologist views it*. In R. S. Valle & M. King (Eds.) **Existential-phenomenological Alternatives for Psychology**. New York: Oxford University Press, 1978, *48-71*.

Collier, G., & Kuiken, D. **A phenomenological study of poetry**, *The Journal of Phenomenological Psychology, 1977, 209-226.*

Cronbach, L. J. & Meehl, P. E., **Construct validity in psychological tests**, *The Psychological Bulletin*, 1952, *52*, 281-302.

Duncker, K. **On problem solving**. *Psychological Monographs*, 1945, *58*, No. 270.

Ericsson, K. A. & Simon, H. A., **Retrospective verbal reports as data**. Unpublished manuscript, 1978.

Ericsson, K. A. & Simon, H. A., **Thinking-aloud protocols as data**. Unpublished manuscript, 1979.

Edelbrock, C., **Mixture model tests of hierarchical clustering algorithms: The problem of classifying everybody**, *Multivariate Behavioral Research*, 1979, *14*,367-384.

Everitt, B., **Cluster Analysis**. London: Heinemann Educational Books, 1974.

Fischer, W. F., *An empirical-phenomenological investigation of being-anxious: An example of the meanings of being-emotional*. In R. S. Valle & M. King (Eds.) **Existential-phenomenological Alternatives for Psychology**. New York: Oxford University Press, 1978, *166-182.*

Fox, D. J. & Guire, K. E. **Documentation for** *MIDAS*. University of Michigan Press, 1976.

Giorgi, A., **The Approach to Psychology as a Human Science**. New York: Harper and Row, 1970.

Griswold, R. E., Poage, J. F. & Polonsky, I. P., **The** *SNOBOL4* **Programming Language**. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971.

Harris, C. W. & Kaiser, H. K., **Oblique factor analytic solutions by orthogonal transformations**, *Psychometrika*,,29, 347-362.

Hartigan, J. A., **Clustering Algorithms**. New York: John Wiley and Sons, 1975.

Hempel, C. G., **Aspects of Scientific Explanation**. New York: The Free Press, 1965.

Holsti, O. R., **Content Analysis for the Social Sciences and Humanities**. Reading, Massachusetts: Addison-Wesley, 1969.

James, W. **The Principles of Psychology. Vol. I**. New York: Holt, 1890.

Jardine, N. & Sibson, R. **The construction of hierarchic and non-hierarchic classifications**, *Computer Journal*, 1968, *11*, 177-184.

Kaiser, H. F., **The Varimax criterion for analytic rotation in factor analysis**, *Psychometrika*, 1958, *23*, 187-200.

Kernighan, B. W. & Plauger, P. J., **Software Tools**. Reading: Massachusetts: Addison-Wesley Publishing Co., 1976.

Koch S., *Psychology and emerging conceptions of knowledge as unitary*. In T. W. Wann (Ed.) **Behaviorism and**

Phenomenology. Chicago: The University of Chicago Press, 1964, *1-41*.

Koch, S., *Language communities, search cells and the psychological studies*. In W. Arnold (Ed.) **Nebraska Symposium on Motivation, 1975**. Lincoln, Nebraska: University of Nebraska Press, 1976, *477-559*.

Kruskal, J. B., **Nonmetric multidimensional scaling**, *Psychometrika*,1964, *29*, 1-42.

Kuiken, D., *Descriptive methods for inquiry in human psychology*. In J. R. Royce & L. Mos (Eds.) **Conceptual Issues in Humanistic Psychology**, *in press*, 1981.

Lingoes, J. C., **An IBM 7090 program for Guttman-Lingoes smallest space analysis**, *Behavioral Science*, 1965, *10*, 183-184.

Maslow, A. H., **Towards a Psychology of Being**. New York: D. Van Nostrand Co., 1968.

McDonald, R. P. & Mulaik, S. A., **Determinacy of common factors: A nontechnical review**, *The Psychological Bulletin*, 1980, *86*,297-306.

Nagel, E., **The Structure of Science: Problems in the Logic of Scientific Explanation**. New York: Harcourt, Brace & World, Inc., 1961.

Newell, A. & Simon, H. A. **Human Problem Solving**. Englewood Cliffs, New Jersey: Prentice-Hall, 1972.

Polanyi, M., **Personal Knowledge**. Chicago: University of Chicago Press, 1958.

Revelle, W., **Hierarchical cluster analysis and the internal structure of tests**, *Multivariate Behavioral Research*, 1979, *14*, 57-74.

Rimm, D. C. & Masters, J. C., **Behavior Therapy: Techniques and Empirical Findings**. New York: Academic Press, 1974.

Rozeboom, W. R. *The art of metascience, or, what should a psychological theory be ?* In J. R. Royce (Ed.) **Toward Unification in Psychology**. Toronto: University of Toronto Press, 1970, *53-164*.

Rummel, R. J., **Applied Factor Analysis**. Evanston, Illinois: Northwestern University Press, 1970.

Rychlak, J. F., **The Psychology of Rigorous Humanism**. New York: John Wiley and Sons, 1977.

Sanathan, L. P., *Discriminant analysis*. In D. J. Amick & H. J. Wallberg, **Introductory Multivariate Analysis**. Berkeley: McCutchan Publishing Cor., 1975, *236-256*.

Schank, R. C., *Identification of conceptualisations* *underlying natural language*. In R. C. Schank & K. M. Colby (Eds.) **Computer Models of Thought and Language**. San Fransisco: W. H. Freeman and Co., 1973.

Schonemann, P. H. & Steiger, J. H., **Regression component analysis**, *British Journal of Mathematical and Statistical Psychology*, 1976, *29*, 175-189.

Shepard, R. N. & Arabie, P., **Additive clustering: Representation of similarities as combinations of discrete overlapping properties**, *Psychological Review*, 1979, *86*, 87-123.

Siegal, S., **Nonparametric Statistics for the Behavioral Sciences**. New York: McGraw-Hill, 1956.

Sneath, P. H. A. & Sokal, R. R., **Numerical Taxonomy**. San Francisco: W. H. Freeman and Co., 1973.

Stephanson, W., **Applications of communication theory : II - Interpretations of Keats' "Ode on a Grecian Urn"**, *The Psychological Record*, 1972, *22*, 177-192.

Thurstone, L. L., **The Measurement of Values**. Chicago: University of Chicago Press, 1959.

Tryon, R. C. & Bailey, D. E., **Cluster Analysis**. New York: McGraw-Hill Book Co., 1970.

University of Alberta Computing Services, The *File Editor*. University of Alberta Press, 1980.

Van Kaam, A., **Existential Foundations of Psychology**. Pittsburgh: Duquesne University Press, 1966.

Walker, J., **National Gallery of Art Washington, D. C.**. New York: Harry N. Abrams, Inc., 1963.

Wallace, W. L., **The Logic of Science in Sociology**. Chicago: Aldine Publishing Company, 1971.

Watson, J. B., **Psychology as the behaviorist views it**. *Psychological Review*, 1913, *11*, 158-177.

Ward, J. H., Hierarchical clustering to optimize an objective function, *Journal of the American Statistical Association*, 1963, *58*, 236.

Williams, W. T., Lambert, J. M. & Lance G. N., **Multivariate methods in plant ecology**, *Journal of Ecology*, 1966, *54*, 427.

Winograd, T., *A procedural model of language understanding*. In R. C. Schank & K. M. Colby (Eds.) **Computer Models of Thought and Language**. San Fransisco: W. H. Freeman and Co., 1973.

Wishart, D., *CLUSTAN* **User's Manual**. Edinburgh: Inter-University/Research Council Series, 1978.

Wittgenstein, L., **Philosophical Investigations**. Oxford: Basil Blackwell, 1976.

Wolf, J. J., *Speech recognition and understanding*. In K. S. Fu (Ed.) **Digital Pattern Recognition**. Berlin: Springer-Verlag, 1976, *167-204*.

APPENDIX 1. INSTRUCTIONS FOR EXPERIMENT I

To begin this experiment I'm going to give you a short series of instructions designed to help you relax. To begin with, I would like you to get really comfortable, get as comfortable as possible, and relax to the best of your ability straight away....(5 sec)

Now I would like you to take in a deep breath, take in a full deep breath and hold it, and as you hold your breath in I want you to pay attention to the tension that accompanies the strain of holding your breath. In particular feel the tension throughout the chest and shoulders...(2 sec) Now breath out, and as you breath out notice how the tension disappears as you resume your normal pattern of breathing, notice how much more relaxed you feel as you breath normally and rhythmically...(5 sec)

Now I would again like you to create tension, this time by tensing every muscle in your body. Tense them tighter and tighter and feel the tension throughout the body. Hold that tension, hold it...(2 sec) Now relax, give up the tension, let your muscles become loose and let the warm pleasant sensation of relaxation envelope your body. Just give over to the beautiful feelings of relaxation....(15 sec). Good.

If one wishes to study responses to works of art, there are several possible ways to proceed. One possibility, and the one chosen for this particular research, is to request that research participants actually describe, as best they can, the features of their experience of a particular work of art. This is not as easy as it might sound. In fact, it is quite difficult to pay attention to the full range of responses that you may have while viewing a particular art work. Even so, the instructions which follow will be an attempt to help you and encourage you to describe as many of the features of your experience of a particular work of art as you can. In the next few moments, I will be showing you how you can describe the changes in your experience of a work of art while they occur.

To show you what I mean, let me demonstrate. Right now and in front of you is a copy of the same painting that I am looking at. In talking about my experience of this painting, there is an entire range of possibilities that I could mention. I may, while looking at the painting, describe my understanding of it. For example, I might say that this appears to be a portrait of a young woman, probably painted in the 16th or 17th century judging by the clothes.

I might also describe my feelings related to the painting. For example, I might say that I find the young woman quite pretty. In fact, the more I look at her the more attractive I find her to be. I feel that she was probably a very warm, pleasant individual to be with, when she was alive.

In addition to these reactions to the painting, I might describe some memories or associations that occur while I pay attention to the painting. For example, I might say that she reminds me of a girl that I met just the other day who was also a very warm, pleasant person, and that I felt that she was an ideal match for my friend who was taking her out.

Beyond these features, I might also talk about my reactions to structural aspects of the painting. For example, I might say that the figure in the painting seems to form a triangle against the dark background. There seems to be a lot of curves and smooth flowing lines in the painting. There's also a feeling of depth that I get from the puffy parts of her clothing. And the colors appear to be quite mellow; certainly not at all harsh.

Finally, I might even talk about my reactions to the task of paying attention to the painting. I might say, for example : Even while I reflect on this painting right now, I'm very aware that this is for the purpose of demonstrating it to someone else. I'm also aware right now that talking about this while I attend to it is hard to do.

Now: this range of responses is intended to be suggestive only. In talking about your reactions to a particular painting, you may talk about this full range of possible reactions and any others that might occur to you. In fact, we encourage you to talk about the full range of your reactions to the painting as they occur to you. Keep in mind that there are no right or wrong reactions to these paintings. If this study is to prove valuable to us at all, it is very important that you describe *your* particular experience of the painting, whatever that experience might be. Again let me emphasize, there are no right or wrong responses. The important thing is that you describe your experience as it actually occurs.

Now: I would like to give you a chance to describe the changes in your experiences of a painting. I would like you to do this for just a couple of minutes as a kind of a warm-up for another painting that I will show you later on. I call it a warm-up because there are a few other things that are involved in describing your experience of a painting, and these require some getting used to. In particular, we are going to ask you to say aloud, for the purposes of recording, whatever changes occur in your experience of the painting. That means that part of what you need to become acustomed to here is talking aloud about any changes in your experience as these changes occur. You may find that this is an uncomfortable procedure at first, but that it becomes easier as you practise it. That is the main purpose of these warm-up excercises.

At this point, I would like to ask your permission to proceed. Are you willing to continue in the experiment ? May I tape-record your descriptions of your reactions to these paintings on the understanding that any information that you provide to us will be kept strictly confidential ? ....

Good, and thank you.

Now before we go any further, let's do another brief relaxation excercise so that you'll be better able to concentrate on the painting. To begin with, tense all the muscles of your body, tense them tighter and tighter; hold that tension...(3 sec)

And now relax, let the muscles of your body become loose, and just enjoy the warm, pleasant feelings of relaxation. Let the feelings of relaxation spread right up the legs and into the buttocks and stomach. Feel it spread deep into the back and chest, and into the shoulders, and neck, and face. Just let the relaxation take over....(15 sec) Good.

What I would like you to do right now is pay attention, and continue to pay attention, to this particular painting. As you pay attention to the painting say whatever occurs to you; whatever memories and associations, whatever feelings, whatever thoughts or fantasies, or whatever else that is part of your experience as you attend to the painting. If, for a moment, you seem to have nothing to say, report taht as well. Say, for example, 'Right now, I'm not sure what to say next' or, if you find that your attention wanders away from the painting, indicate this as well. You might say, for example, 'My mind is beginning to wander and I'm beginning to think about when this experiment will be over'. Any changes that occur to you while you attend to this painting are of interest to us, so please do not censor any of your reactions. Recall that anything that you might say will be kept completely confidential. Finally, if you find for a moment that you are lost for words, you might try to use this open-ended sentence to help. Simply say to yourself when your wondering what to do next :'Right now I'm.....', and then finish that sentence by describing whatever it is you are doing, attending to, or feeling.

During these next few moments, I will ask you to do this and we'll stop occasionally and talk about what you are doing. O.K.; I would like you to begin now....

(When subject stops and says he/she is 'done', has 'nothing more to say' etc.) When you feel finished before I have asked you to stop, try this. Just say, 'Right now I'm finished, stuck; I've nothing more to say' or say whatever fits for you, but continue to attend to the painting and continue to report what you experience, even if that includes thoughts about the experiment, where you need or want to be, and so on. Try that now and then simply continue to *describe any changes* that occur in your experience.

(If subject stops a second time) You might try the open ended sentence 'Right now I am...'. Do that at any time you feel stick or at a loss for the next thing to report.

Now you have an idea of the kind of task that we will be giving you to do with a second painting in just a moment. When I show you the second painting, I would like you to describe your changes in experience, without interruption for a full four minutes. Please continue to describe your experience throughout that interval in the ways we've just gone over. As a reminder, whenever you feel that you may be blocked, or that you may be finished, mention that, and then perhaps go ahead to use the open-ended sentence : 'Right now, I am.....' and continue.

Before we go any further, let's again do some brief relaxation excercises. Again, tense all the muscles in your body, tense them tighter and tighter and hold that tension...(3 sec) And now relax again. Let the muscles of your body become loose, and, again, just enjoy the warm pleasant feelings of relaxation. Just continue relaxing fo a while....(30 sec) Good.

O.K.; I would like you to begin describing your experience of this painting now....

APPENDIX 2. STRUCTURED QUESTIONNAIRE

The following questions deal with the experiences you had while viewing the painting. For each question, please mark the appropriate category from 1 to 9 on the accompanying computer score sheet to correspond to the number on the nine point scale which best reflects your own personal experience. This information will be kept strictly confidential so feel free to answer as accurately as possible. Thank you.

My experience with the painting which I viewed was :

1. positive	1 2 3 4 5 6 7 8 9	negative
2. pale	1 2 3 4 5 6 7 8 9	colorful
3. stimulating	1 2 3 4 5 6 7 8 9	fatiguing
4. depressing	1 2 3 4 5 6 7 8 9	uplifting
5. interesting	1 2 3 4 5 6 7 8 9	uninteresting
6. unsatisfying	1 2 3 4 5 6 7 8 9	satisfying

The painting itself was :

7. warm	1 2 3 4 5 6 7 8 9	cold
8. simple	1 2 3 4 5 6 7 8 9	complex
9. stable	1 2 3 4 5 6 7 8 9	unstable
10. realisitic	1 2 3 4 5 6 7 8 9	unrealistic
11. heavy	1 2 3 4 5 6 7 8 9	light
12. powerful	1 2 3 4 5 6 7 8 9	weak
13. curved	1 2 3 4 5 6 7 8 9	angular
14. balanced	1 2 3 4 5 6 7 8 9	unbalanced
15. disorderly	1 2 3 4 5 6 7 8 9	orderly
16. tense	1 2 3 4 5 6 7 8 9	tranquil
17. clear	1 2 3 4 5 6 7 8 9	indefinite
18. ugly	1 2 3 4 5 6 7 8 9	beautiful
19. barren	1 2 3 4 5 6 7 8 9	rich
20. subtle	1 2 3 4 5 6 7 8 9	bold

The artist was primarily concerned with :

21. harmony	1 2 3 4 5 6 7 8 9	conflict
22. objective ideas	1 2 3 4 5 6 7 8 9	inner feelings

Rate the importance to your perception of this painting of :

23. shape

not at all important	1 2 3 4 5 6 7 8 9	extremely important

24. line
not at all important 1 2 3 4 5 6 7 8 9 extremely important

25. light
not at all important 1 2 3 4 5 6 7 8 9 extremely important

26. color
not at all important 1 2 3 4 5 6 7 8 9 extremely important

27. composition (arrangement of elements)
not at all important 1 2 3 4 5 6 7 8 9 extremely important

How important to your experience of the painting were your impressions about :

28. the artist's feelings or emotions
not at all important 1 2 3 4 5 6 7 8 9 extremely important

29. the artist's fantasies or imagination
not at all important 1 2 3 4 5 6 7 8 9 extremely important

I have a well-formed impression of this painting.
30. not at all 1 2 3 4 5 6 7 8 9 very much so

I would like to study this painting at greater length.
31.not at all 1 2 3 4 5 6 7 8 9 very much so

Even now I can see the painting in my mind's eye.
32. not at all 1 2 3 4 5 6 7 8 9 very much so

While viewing the painting my experiences were:
33. clear and definite 1 2 3 4 5 6 7 8 9 fuzzy and confused

I can recall my experiences while viewing the painting:
34. extremely vividly 1 2 3 4 5 6 7 8 9 not at all vividly

I felt that it was difficult to arrive at a well-articulated and definite impression of the painting:
35. not at all 1 2 3 4 5 6 7 8 9 very much so

Viewing the painting was an emotionally draining experience:
36. not at all 1 2 3 4 5 6 7 8 9 very much so

Viewing the painting helped me clarify one (or more) of my personal concerns:

37. not at all 1 2 3 4 5 6 7 8 9 very much so

At this moment, I feel more aware of myself than is usual :

38. not at all 1 2 3 4 5 6 7 8 9 very much so

I became so involved in the painting that I forgot myself and my surroundings:

39. not at all 1 2 3 4 5 6 7 8 9 very much so

I felt the "distance" between myself and the painting closing as I continued to view it:

40. not at all 1 2 3 4 5 6 7 8 9 very much so

To what extent did you experience clear shifts in feeling or discontinuities in experience while viewing the painting ?

41. never 1 2 3 4 5 6 7 8 9 many times

My thoughts while viewing the painting occurred as :

42. images 1 2 3 4 5 6 7 8 9 thoughts

I feel that words can adequately capture the experiences that I had with the painting:

43. not at all 1 2 3 4 5 6 7 8 9 very much so

I found myself worrying about how well I was doing while viewing the painting:

44. not at all 1 2 3 4 5 6 7 8 9 very much so

I tried to be as precise and systematic as possible while experiencing the painting:

45. not at all 1 2 3 4 5 6 7 8 9 very much so

My experience with the painting was similar to other experiences I have had with paintings or works of art:

46. not at all 1 2 3 4 5 6 7 8 9 very much so

This experience has suggested new alternatives for exploring my response to art:

47. not at all 1 2 3 4 5 6 7 8 9 very much so

My education has included training in art history and

appreciation.
48. not at all 1 2 3 4 5 6 7 8 9 a great deal

I like to draw and/or paint.
49. not at all 1 2 3 4 5 6 7 8 9 very much so

I enjoy viewing art.
50. not at all 1 2 3 4 5 6 7 8 9 very much so

I engage in solitary self reflection.
51. almost never 1 2 3 4 5 6 7 8 9 very often

I have experience with one or more forms of meditative discipline.
52. not at all 1 2 3 4 5 6 7 8 9 a great deal

My dreams are typically very vivid, imaginative, and emotional.
53. not at all 1 2 3 4 5 6 7 8 9 very much so

APPENDIX 3. DEBRIEFING FOR EXPERIMENT I

The experiment in which you have participated is concerned with the nature of your experiences in response to art as part of a more global concern with the nature of internal experience in general. It is the eventual hope of the experimenters to develop a valid and reliable method of classifying people and experiences on the basis of freely chosen, spontaneous verbalizations. The present experiment takes a preliminary step in this direction.

The questionnaire responses which you made along with a transcript of your spontaneous response to the wotk of art that was presented to you, will be examined carefully to try to establish whether there are distinctive 'types' of experience common to people other than you. If there are (as we hope), we will attempt to construct a taxonomy of these distinctive types for use in future experiments.

We hope it is now clear to you that no deception was involved in this experiment and that our motives were not hidden except insofar as they might prove disruptive of your spontaneous experiencing of the picture that we presented to you. All information that we collected as a result of your participation in this experiment will be kept strictly confidential.

If you are interested in reading a research report that had an aim similar to this experiment, we invite you to ask for the folder labelled 'Stephan' [1] at the Cameron Library Reserve Reading Room. That report attempts to discover distinctive types of experience elicited by Keats' famous poem 'Ode on a Grecian Urn'.

If you would be interested in receiving a summary of this research when it is completed, please leave your address.

Do you have any questions ?

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[1] Stephanson, W. Applications of communication theory : II Interpretations of Keats' "Ode on a Grecian Urn". *The Psychological Record*, 1972, *22*, 177-192.

APPENDIX 4. TRANSCRIPTS FROM EXPERIMENT I SUBJECTS

SUBJECT 1

1: 1 O.K. I see a picture of a man there.

1: 2 And a bird down in the lower left hand corner of the painting.

1: 3 It strikes me as odd because... the face of the man looks... like it's ... it doesn't look... human.

1: 4 It has the shape of a human but... it just doesn't look real.

1: 5 Probably the funniest part of it is the guy has bumps all over his nose... crooked nose and his lips are shaped awfully funny.

1: 6 The clothing he appears to be wearing is weird... looks like he might be an ancient Greek.

1: 7 Seems to be standing in some type of court room...

1: 8 Don't know how you would describe it exactly, but... he's standing there with... with sort of a... feeling of shame on his face.

1: 9 His eyes are slanted... almost closed.

1:10 Looking into the background I can see that the artist has been able to capture depth in there by... raising the door in the back a little higher than usual which makes it, which is the depth appearance.

1:11 And one of the doors is opened.

1:12 I would presume that the person just walked into the door and is standing there thinking about something that he had just done which was, as I'd say before, shameful by the expression on his face.

1:13 I have real troubles figuring out why the bird was put in there.

1:14 Looks like a sparrow hawk... it's got the shape of a larger sparrow... with a large beak on it... sitting on a branch...looking in the opposite direction as the man is.

1:15 So... well... now that I take a look at the periphery of the picture I can see that the bird appears to be standing... that the guy appears to be looking out the window almost... cause this painting appears to have been made through a window.

1:16 The view we get is the artist's point of view looking through a window.

1:17 And......it's hard to decide really why the bird is there.

1:18 And exactly what is going through the person's mind knowing that he is just standing there thinking about something.

1:19 And......I can't think of anything else right now to describe about the picture.

1:20 Right now I'm thinking of this picture and comparing it to the other one... to see just exactly the techniques that the artist used.

1:21 Because...this artist appears to be from an earlier period than the last one just by the way he's captured the facial features and things like that. Interesting.

SUBJECT 2

2: 1 O.K. The first thing I notice is the extremely bright color of red. The whole painting is rather bright from that; it makes the person in the painting stand out.

2: 2 The man looks like he's rather intelligent.

2: 3 There's something about him that seems a little bit... deceptive, I guess is the right word.

2: 4 The background is a little bit darker than the foreground making him stand out a little bit more I guess.

2: 5 It's unusual to have that bird in the painting.

2: 6 ...Seems...I can't understand why... how that bird fits in there at all.

2: 7 Judging from the clothes, it's almost like a priest type of outfit he's got on.

2: 8 Must be... could be any period of time... probably eighteenth century.

2: 9 ...My mind is sort of wandering a little bit right now.

2:10 The person's nose is pointing down... I don't know what that indicates... maybe genetic defect or something.

2:11 ......Feel that he might be looking at something... particular.

2:12 ...Possibly just came into the room.

2:13 And...I have very little else to say about this... I'm feeling fairly relaxed looking at it.

2:14 ...I'm wondering what the back of that outfit looks like.

2:15 ...I don't know what else to say about this.

SUBJECT 3

3: 1 Well, it gives me the impression of a kind of a smug person the way he's staring off there in the distance.

3: 2 He seems to be of a proud nature, the fellow, the high brow and set jaw...

3: 3 And the bird in the foreground suggests to me also a bit of softness but he's kind of covering that up.

3: 4 And he reminds me of someone I know, a friend of mine, with his hair like that.

3: 5 It suggests someone of an earlier age, the eighteen hundreds or something like that.

3: 6 Depth is given in the straight lines in the background and they contribute to this feeling of depth in the picture.

3: 7 That open door, I feel, is quite significant cause it tends to be inviting...

3: 8 Like there might be something outside trying to get in, like some sort of outside emotion like the softness of the bird trying to get into this fellow's nature.

3: 9 And the colors are quite vibrant. The red is overpowering. It draws attention to the central figure there.

3:10 And he's got kind of a straight grimace in his mouth. You can tell... looks like he's got something on his mind... something really bothering him or something.

3:11 And the bird... it tends to be outside the picture... and this also could be like outside his nature trying to get in. And seems that's what about the bird's for.

3:12 And the door being open, is for inviting.

3:13 And the blue sky, looks like a blue sky or something outside - again the outside being exemplified there.

3:14 And that's about all I can think for this one.

3:15 Right now I'm thinking of how he fills up the whole picture so he would be the central character of the painting.

3:16 He covers from the bottom right up to the top.

3:17 He...again I ran out of something to say here.

3:18 Of the door, one half ,one door is closed and one is open so it could be kind of a limitation on what he might allow in... into his nature and into his thoughts and feelings.

3:19 You can't see the lower half so you don't know what he's preoccupied with so there's a limitation there so you just have to look at his face and from that try and tell what he's feeling.

3:20 And he doesn't seem to be looking at anything, kind of looking off into the distance so he's obviously thinking about something or other.

3:21 Judging by the tenseness in his forehead it's probably something disturbing.

3:22 And... the painter was probably trying to get something off, get, show something to the viewer of this painting.

3:23 Maybe somebody I feel that the painter might identify with, it's, or the mood that the painter is feeling at that time.

3:24 I don't think it's a portrait of anybody in particular; it doesn't seem to be.

3:25 It kind of invites you to try and determine what he's thinking of.

3:26 But that little bird there... it's kind of attracting in the corner there. It draws attention to itself cause it's kind of looking off in the distance as well.

3:27 It also blends into his arm so that maybe the artist didn't really want to have as much attention put into it as the fellow in the picture.

SUBJECT 4

4: 1 O.K. Looks seventeenth or eighteenth century.

4: 2 Some guy...some guy who looks maybe stuckup or, I don't know, looking down on somebody or something.

4: 3 Seems to be standing in a doorway.

4: 4 There's a bird out in front of him.

4: 5 And...perhaps he's a bit of the higher upper class. He's walked out the doorway and maybe he's looking down on the people...

4: 6 Thinking...I don't know, some kind of disdainful thoughts about them.

4: 7 ...As if his glance were looking all the way down that long nose of his which just, I don't know, follows the same line.

4: 8 Looks dressed a little bit unusual with a red cape, well, red thing over him... as if maybe that weren't quite the thing for the normal people of the day to be wearing.

4: 9 Leaves the door open as if he just come through there and maybe he wanted to go back after taking a look out the window or off the balcony.

4:10 Kind of a funny sort of a hairstyle. First... the first glance I saw of the picture I thought it was maybe a woman. Maybe it's just the way they had the hairstyles in those days.

4:11 Fairly simple...fairly simple picture. It could be a portrait but... think it has something to say, maybe...

4:12 A portrait wouldn't be quite as flattering as... would be a bit more flattering than this.

4:13 Looks like a portrait that a person might want to have done of themselves if they wanted to say, project an image of power... or maybe aloofness from the rest of the crowd.

4:14 Maybe the... maybe the bird is a symbol of something, could it be just to show that the person's on a balcony or, you know, outside; in a hallway or whatever.

4:15 Kind of stuck again here.

4:16 I feel... bored with the picture.

4:17 Not all that...if I could figure out, well... it, it seems like the person has a, an attitude of some sort which the portrait is trying to present, as if the person has some definite opinion of whatever he's looking at.

4:18 Either that or he's thoughtful and... thoughtful and in contemplation. Maybe he's not even looking at whatever's out there at all and he has some sort of, I don't know, plan or scheme in his mind.

4:19 By the way the portrait is drawn it doesn't seem like it's any kind of a good scheme if it is a scheme.

4:20 But... you know, this person is in some sort of a contemplation. You know it could be some kind of a evil character in a novel or a movie, perhaps.

4:21 You know, it's how you stereotype people, by the way... by the way they look, you know judging the book by its cover.

4:22 And... how am I doing here, four minutes already ? Guess not. O.K. Can't think of much else. I've kind of given all my impressions.

4:23 The painting kind of strikes you first off because of that big expanse of red, I mean... could be that red symbolises some kind of harshness in the picture, in the, perhaps in the whole situtation.

SUBJECT 5

5: 1 First thing that strikes me at firstly with this picture is the red; the shocking brightness of the red.

5: 2 The second feature that stands out immediately is the gentleman's nose which is rather long and pointed.

5: 3 The sleeve... it's kind of strange because the sleeve blends into the bird's coat. You can't actually pick a point where the bird's feathers begin and the gentleman's sleeve actually ends.

5: 4 The gentleman looks very aristocratic, very arrogant. One wonders by the looks of him if he actually has reason to.

5: 5 His eyebrows suggest a sort of aristocratic birth.

5: 6 And the way his eyes, he's obviously looking down on something which adds to the impression very much.

5: 7 He appears to stand... in a window.

5: 8 It's kind of illusionary because it, looking from it one way it looks like a door frame, and with the bird out front it looks like a window on the other hand.

5: 9 Those lips seem to be curved to a slightly sarcastic smile... which also adds to the impression of being slightly stuck-up.

5:10 The impression I get from this picture is that it's the type where perhaps the gentleman in the picture ordered a painting to be painted of himself because he thought he was so good

5:11 ...and if anything the artist has probably complimented him in the picture, because he probably knew that otherwise he'd be in trouble.

5:12 Another thing that seems strange in this picture too is that... on the front ok you have this bird which suggests that this is some kind of window that we are looking through to him and he's standing beside the window yet...

5:13 the door behind him is opening up to what appears to be a blue sky.

5:14 So one questions whether he is standing in front of a window or whether we are looking through a window to him, like whether the window's behind or in front of him.

5:15 I don't really like this picture.

5:16 It's got mostly lines that seem to be vertical and very, very few horizontal lines. The eyes are always going up and down and never across the picture.

5:17 The lines that contribute to the vertical are his cloak, all the lines there are pretty well up and down, the lines of the doors behind him, the window frame, although there is some horizontal in the window frame.

5:18 Even the line in his forehead, there is a dipped line running from his nose up to his hair that is vertical.

SUBJECT 6

6: 1 The man seems very condescending, he's looking down his nose and that's kind of funny because he has a really long nose.

6: 2 And he looks... as if he's from another period, he looks very wealthy.

6: 3 There's a nice texture to the painting. You almost feel like the red part of it you could touch.

6: 4 And...he seems very isolated, just the idea of him being in front of an open window and no other idea of where he is.

6: 5 I'm blocked...

6: 6 He looks either as if he's sort of disgusted or, or...as if he's just seen something that - I don't know- that I think he thinks he's above. A very condescending kind of look.

6: 7 Not kingly so much as protective of himself. And you get the feeling he's alone quite a lot.

6: 8 You get the feeling he'd be happier if he looked out the window instead of just sort of standing there protecting himself maybe.

6: 9 There's a bird in the left hand corner, it seems almost to come out of the velvet of his clothes and I didn't notice it till just now.

6:10 And it doesn't seem to fit with the whole picture, it doesn't seem to have anything to do with, with the man.

6:11 He doesn't seem the kind of person who would have animals around him. He doesn't seem that peaceful or soft. And the idea of a bird just sort of being that close to him just doesn't, doesn't fit my image of him.

6:12 The bird's on a branch and... the perspective's kind of strange because it looks like the branch comes slightly out of the picture and he might be...and you might be looking at him outside and he's got a window between you and, and him...

6:13 so that the bird is in some way... I guess, sort of, on the window sill or just above it or something like that, a branch may be stretching out across the window sill.

6:14 I keep sort of shifting between thinking that the bird is outside and there's a window separating the man and the bird or that the window's open and the bird's right next to the man. I think it fits more that the bird would be outside.

6:15 And if that's true and it's kind of strange that he's... the man is facing the window and yet not look at it... not look outside of it, he's looking off to the side.

6:16 The perspective seems to keep shifting.

6:17 Sometimes it seems like there's just a small room that he's in and then a distance in the back and then either a window or a door outside.

6:18 And other times it seems like the door or window, the big wooden structure is right behind him.

6:19 And I'm not even sure any more that those doors are to a window or just far enough away that they're, that it's actually a full size door.

6:20 I'm thinking that it's kind of strange that my first impressions were all of the man and what I thought he was like ...

6:21 and the more I look at the picture the more I'm sort of getting interested in the perspective and trying to figure out where things are placed.

6:22 ......I can't think of anything else to say right now.

SUBJECT 7

7: 1 I don't know, this guy... well first of all it seems to be his arrogant sort of looking... like he's sort of a snob.

7: 2 And another thing's this is a rather abstract painting.

7: 3 Looks like he's wearing his robe with everything backwards.

7: 4 And the sleeve comes down and transforms into a bird.

7: 5 The bird like, I didn't notice it right away. I sort of... I sort of just glanced down and all of a sudden it was there. Sort of an odd painting. It's strange.

7: 6 There's an open door in the background.

7: 7 There's a lot of red, the first thing you see is the red.

7: 8 I don't know what to say about it, it's strange.

7: 9 Maybe it's just the backwards way of life maybe.

7:10 Just...it's...I don't know, I seem bothered by the painting, it's....weird.

7:11 Something just doesn't seem... it seems out of place.

7:12 Like I don't think the artist really tried. Seems like he was just fooling around with this one. Just slapped a whole bunch of things together and wanted to see what it looked like but... it's kind of weird but...

7:13 Just like somebody twisted that guy's head backwards.

7:14 The bird... he was just stuck in there maybe as an afterthought I guess... looks like it blends right in.

7:15 It's an oil painting. Really don't know what to say about it, it's strange.

7:16 The background is... looks like he's standing by a window with a tree just outside in the background but out in the foreground where you can't see it the bird's sitting there.

7:17 The door looks like it's open to the outside as it did in the background.

7:18 But... it... it seems like a very odd painting. That's the only thing I can say about it.

7:19 The guy himself has an arrogant sort of look about him... stuck up, looking down his nose sort of at persons or stuff like that.

7:20 It's rather weird. Looks like the painter was on drugs or something.

7:21 He started out doing something and then sort of went abstract. Looks like he started out with sort of a regular portrait maybe or something like that and then threw in the abstract.

7:22 It could be... like if he was a monk or something, I could understand why the thing was tied up at the front. Could be something like a monk or something and that's why everything's so barren.

SUBJECT 8

8: 1 It seems kind of from the period of around Henry the Eighth.

8: 2 Looks like some kind of lord.

8: 3 Reminds me very much of a knight... maybe a very victorious knight, looks very proud.

8: 4 This bird down in the corner maybe some symbol of... what area he's from, or maybe a crest.

8: 5 He seems to be looking down, now... looks very smug.

8: 6 ......oh......

8: 7 The high collar, the white collar means, gives a feeling of religious, and the times are very religious.

8: 8 This bird might also signal that he's a very good hunter, a symbol of hunting, or maybe it's his hunting bird. They do that very much then.

8: 9 No crown on his head; he may be just... just a knight, no lord at all.

8:10 The black hair and his eyes seem to give a...seem to give a thing of being evil even though he might not be the...looking down, looks like he's done something, looking down at some one.

8:11 ...oh...long...

8:12 His nose seems to make me feel as if there's a family back in the days, the sixteen hundreds, and they all had the long nose, that seems to...the nose seems to stick out... and be a noticing factor in his body, his face.

8:13 ...The fur in his sleeves... the sleeves look as if they're fur on his...he looks like he has fur sleeves which could be another sign of a great hunter ?

8:14 ...wealth...

8:15 The open door gives me a feeling he's just come in, maybe it's cold out, maybe it's warm out, he's just come in.

8:16 The wall's very square. Nothing fancy. Everything seems to be square behind him. Maybe the architecture wasn't... too sophisticated I guess you'd say.

8:17 Maybe he's done his duty; he's come in to report.

SUBJECT 9

9: 1 The painting seems to be very graphical or a abstract type.

9: 2 Pictorial...

9: 3 The figure's are two dimensional in nature. It doesn't look quite proportional...they don't look right. It's not a proper image.

9: 4 The face of the man sitting in the picture is...unproportional. It's not symmetrical on either side of the nose. On the far side it seems to be painted up... it...

9: 5 My eyes keep getting drawn to the robe he's wearing.

9: 6 I don't know what it is about this picture. It's... very different.

9: 7 The bird in the lower left hand corner of the picture is making me very curious on... what it's purpose is in the picture. It doesn't seem to fit... or be part of the picture.

9: 8 ...The doorway... seems to be... extremely large. For instance... I don't know...

9: 9 The rest of the background is very very dim, greyish colors and the robe seems to draw my attention very very early and... it seems to draw you into the centre of the picture, your attention.

9:10 However it's hard to pay attention to the other small details in the picture.

9:11 The face of the person seems to be very noble type face, quote noble type face. Gives you a pictorial or a... you start to imagine about a sixteenth, seventeenth century noble who was very upstanding and looks down upon the peasants type... of expression.

9:12 ...Certain portions of it are drawn with very... with artistic talent, the facial area...

9:13 however the robe and the arm of picture seems to be very roughly drawn, very... as though it exemplified a real talent, I don't know it... seems like it's just, just kind of laid on to the picture.

9:14 The face seems to have a good... texture you could say.

SUBJECT 10

10: 1 Well there's a man standing right there.

10: 2 He seems to be quite proud... seems to be very confidant, but... not a very gentle person, seems to be quite cold.

10: 3 And... the door is open and it seems to me that he refused to go somewhere or something like that.

10: 4 And there's a bird there which is a funny place for a bird.

10: 5 And then the man... he is not very handsome with a big nose and... but something's very confident and...

10: 6 it seems to me that he is in a very small place.

10: 7 Oh no, that's not the door I guess, that's a window... looks like it.

10: 8 He turns his back against the window... seems to be refusing to do something.

10: 9 He seems to know what he is doing, I guess, because he looks very confidant.

10:10 And there is a... little bit of... thought, that's the way I feel, a little bit of evil in him.

10:11 I don't know, maybe he's up to something very obnoxious, very unfriendly.

10:12 He reminds me of some, some, some villains in those old movies... the movies about nineteen or sixteenth century.

10:13 Guess that's about all I can think of.

10:14 Let's see... he seems to be a nobleman of some kind. His dress is quite... quite elegant and his hair is very well combed and...

10:15 I don't know, I just don't like this person...seems to me that he despised everything, he looks down on everything in this world.. he's too proud.

10:16 Just don't like his character I guess.

10:17 That's about all I can say right now.

10:18 That bird is just not in the right place I guess... It's there I just don't know why it's there. Seems... seems to me that it is... I don't know for no reason you know the artist shouldn't put the bird in there, in the picture.

SUBJECT 11

11: 1 It's ugly.

11: 2 He's got his clothes on backwards I think or so it looks like it.

11: 3 He's got a big nose.

11: 4 It doesn't realistic at all... the person at least.

11: 5 The bird looks nice... looks really good...

11: 6 I don't know...

11: 7 I can't tell if that's a door or a window... no I think that's a window in the background.

11: 8 His clothing is quite bright.

11: 9 His eyes are almost closed.

11:10 I get the feeling that he's stuckup by his expression on his face.

11:11 I would think... that the picture is done about the sixteenth or seventeenth century.

11:12 I'm blocked right now.

11:13 He has a white collar on his neck...

11:14 The bird has red feet.

11:15 His picture takes up most... his body takes up most of the picture.

11:16 He looks like he's looking at his nose... like it... at the tip of his nose.

11:17 His hair is quite long and wavy.

11:18 It's a stupid picture.

11:19 There's not much to the picture.

11:20 The bird is standing on a branch; the bird in this picture doesn't really fit. I don't think it has anything to do with it really.

11:21 It's probably a portrait of somebody...

11:22 Possibly he's rich or was rich.

11:23 He's got a line on his forehead... coming down between his eyebrows. Possibly due to tension.

11:24 You can't see his ears.

11:25 His clothing has some kind of fur on it.

11:26 The doors to the window are huge in the back, they look like they're very thick and heavy.

11:27 ...can't think of anything else.

11:28 He doesn't look like he has very long eyelashes.

11:29 The wall in the background looks like it's cement... or at least something hard like in the Middle Ages.

11:30 I'm wondering why that bird's in there.

SUBJECT 12

12: 1 Looks like it's a picture of the olden days about the sixteenth or seventeeth century.

12: 2 And there's a kind of bird in the bottom left hand corner of the picture.

12: 3 And the man is looking downwards, he looks like an officer of the army in the olden days... probably of the... some sort of French... revolution.

12: 4 In the background there's an open window.

12: 5 From my past experience, the man in the picture is probably at a loss... maybe he's an officer and he couldn't figure out what he should do next for the army.

12: 6 I think that is all I can say about this picture for the time being.

12: 7 There's a long kind of... depression in his forehead and his nose is very hooked up.

12: 8 I think he's sort of kind of cunning and foxy. He doesn't seem too truthful, looks more like a kind of crook.

12: 9 Right now I think I'm at a loss for words again. I feel I can't say any more about this picture.

12:10 ....I can say that he's from the sixteenth or seventeenth century by looking at his clothes and his hairstyle. It looks pretty obvious that he's wearing a kind of cloak over his uniform of some sort.

12:11 The colors are very pleasant; they're not that harsh.

12:12 The colors are very well balanced. Shows a lot of contrast.

12:13 On his clothes I notice that he has quite some bit of fur trimmings, some fur like on his shoulders and around the collar.

12:14 I'm at a loss for words again. I don't think I have much to say.

SUBJECT 13

13: 1 Oh, first of all that red hits you right in the face.

13: 2 And all of a sudden you notice this bird...doesn't seem like it should be there, it's sort of... because it's so blended into the brown of his sleeve.

13: 3 And the bird has little red feet, too.

13: 4 I look up to the face and I see a stern serious face. It's looking down at something, I suppose he's thinking.

13: 5 I see the brown behind his face atop the door.

13: 6 I like the texture of this... of this painting, I can see the wood. I can feel the wood of the door because of the way he painted the brown a little bit lighter and darker here and there.

13: 7 The face is the same way, he did it by... created the form just by shading different places darker, that's how he made the chin, doesn't appear to be any line... a series of maybe dots darker...dots and lighter dots.

13: 8 I'm looking at the lines in the cloak, kind of... dark lines suggest holes and...no it's the material.

13: 9 There's... pardon me, there's a white strip on his collar which sticks out quite easily against the brown black of his hair.

13:10 His eyebrows are sort of a little bit lighter but of that same dark color.

13:11 His eyes... you can look at them for quite a while. They suggest quite a bit of thought, and...

13:12 I wonder where he must be looking now, and what he must be thinking.

13:13 His nose is low, it's skinny... not all that great looking.

13:14 The picture's framed... I see that the one color doesn't go all the way along the whole edge of this picture... sort of an optical illusion, and it moves.

13:15 There seems to be a branch that the bird is sitting on. I don't know what that's for.

13:16 I can see that it was a... quite a few years ago, in the past, in the time of knights and things like that.

13:17 An English picture it looks to me... the man's English.

13:18 I don't know, it's not all that interesting. I can look at it for a while. But then I kind of get bored with it.

13:19 I see that the background color when the door is open is sort of a grey, almost blue. That's not bad.
13:20 He's done quite a good job on the face, I can see facial muscles, quite a few different ones. He's got a cleft chin, quite a few lines in around there.
13:21 I wonder what the painter himself is like. I don't know whatever would possess anybody to paint a painting like this.
13:22 I couldn't do it, I couldn't sit hours on end painting something... as simple, not that it was simple to do, but there's not all that much to look at.

SUBJECT 14

14: 1 Oh, its... it doesn't look real at all. Doesn't look like it could actually be a person. Just by the way it's painted somehow; the nose looks unreal, the jaw looks unreal.
14: 2 It doesn't look like it was actually painted while the person was actually standing there for a portrait.
14: 3 I don't know why the bird's in there.
14: 4 It's just a very... a really different picture.
14: 5 He's got a really long nose, something you really notice. His eyes are kind of closed. He just doesn't look... real almost.
14: 6 He's standing funny somehow...
14: 7 Right now I'm feeling... this isn't a very pleasant picture, it doesn't... looks so...it doesn't look real at all.
14: 8 It doesn't give you any real feelings, definitely not any feelings of warmth or anything. It's just a very... trying picture, it just doesn't give that many feelings.
14: 9 I'm getting stuck again.
14:10 Right now I'm feeling... not too much about the picture, there's not too much to it.
14:11 It's just a background, looks like some doors behind, and the window's open, and a man's standing, I guess it must be by a window since there's a bird, looks like he's sitting on a branch or something...
14:12 The man's eyes are kind of closed...looking down his nose...still somehow he's standing funny because there's so much... shows so much of his front there.
14:13 The bird looks better than the man does.
14:14 I can't really... feel too much else about the picture.
14:15 ...He looks like he's very stern.
14:16 Right now I'm feeling that I wonder when the four minutes are over.
14:17 There's not too much to concentrate on in the picture, it's just really really bare.
14:18 Suppose maybe he was a prince or a king or something... sixteenth, seventeenth century or something. He had his portrait done.
14:19 I'm stuck.

14:20 ......Saw a funny line down his forehead. It's funny how it just... looks like a deep line, it kind of cuts his forehead. Looks kind of unnatural.

SUBJECT 15

15: 1 O.K. the guy in the picture seems to me kind of arrogant from the way his lip curl's upwards and the tilt of his nose... the way he looks down on things.
15: 2 Seems to belong to some kind of clergy from the outfit he's wearing.
15: 3 And... seems, I don't know, kind of stumped right now.
15: 4 Gives the impression of being a hard person. He's got a very straight jaw and thin lips.
15: 5 And... he... I'm really kind of stumped, there's nothing to say about this picture.
15: 6 There's a bird in the lower left corner I notice.
15: 7 Seems perched on a branch outside the window.
15: 8 ...The guy seems to be wearing a velvet, a red velvet and full thing.
15: 9 Seems slightly amused about something... also quite serious.
15:10 I don't get anything more out of this.
15:11 Right now I'm kind of wondering what else to say that I can see in the picture,
15:12 except that there's an open door behind him. And there's light shining out from the room. Looks like he just stepped out of an office or something... outside.
15:13 He seems to be wearing something backwards... like his cloak or whatever.
15:14 I'm... I don't get very much more out of this. I don't know what to say.
15:15 Seems like there's light from the window shining on this guy. He must be standing in front of the window.
15:16 The bird seems very trusting to be so close to the person on the other side.

SUBJECT 16

16: 1 I'm not too impressed overly.
16: 2 But... the fellow's facial features I find rather repugnant, especially with his hair that way.
16: 3 Looks like he's got his suit on backwards, the high collar up front seems to be opening up in the back.
16: 4 But judging from the style again I would say that he's more of a medieval age.
16: 5 Just noticed the bird in the bottom of the picture. Sort of blends really, really well into his sleeve. Hard to notice at first. Don't know exactly why it is there.
16: 6 Right now I'm trying to see if there's anything behind the door that I should see
16: 7 or whether this painting should symbolize

anything, in respect to the open door or the bird and trying to figure if I know anything that correlates those two.

16: 8 Right now I'm concentrating again on the man's features; his semiclosed eyes and his very sharp pointy nose sort of pointing down and his very dark full head of hair; very full, it's jet black sort of and looks very thick.

16: 9 His...He seems...gives me the impression of sort of an evil person, I don't know exactly why but I get that sort of feeling; perhaps it's the nose or something. I don't know if he's looking down on something or what.

16:10 Judging from looking at the whole picture as a whole it's very bright right in the middle with the light of his face and the bright red suit; the greys on the outside and the browns sort of between the bright and the grey, sort of to transition.

16:11 The whole thing seems to focus on the fellow's face. I don't particularly care for that.

16:12 Looking again at the bird, don't know what type of bird it is, seems like a very ordinary bird, it's not anything fancy.

16:13 Seems to be sitting on a branch. I can't quite make that out if he's carrying something underneath his feet while it's sitting on the window sill.

16:14 I presume it to be a window because of the grey border around, immediately on the edge of the picture, that we're looking in, seeing this fellow with the door. I can't see any door handles, so I don't know if looking at the structure of the door.

16:15 Right now I'm looking at the lines of the painting, how the perspective works, the doors all seem to be vanishing in, it's a one point perspective picture. And the doors give me that indication.

16:16 And also right now I'm concentrating on what type of material would that be that the door is, is that concrete or is that painted wood ?

16:17 Seems to be a light on the other side of the door shining on to the door jamb... and the light is off to the right, probably right behind the closed section of the double doors.

16:18 Gives that shadow and lights up the one door brighter than the other... lighter brown.

SUBJECT 17

17: 1 Oh, he looks Italian.

17: 2 I don't like his nose.

17: 3 It looks to be portrait of an Italian noble.

17: 4 It reminds me of patrons and how artists in the past had to rely on people who were rich to pay them. It had an effect on the art they had to produce to please the patron. It's a good thing it's not that way now.

17: 5 Hey, there's an open door. That's symbolic... I like open doors. There's open sky.

17: 6 There's a bird in the bottom. Birds, to me, are natural, represent freedom to me.

17: 7 This person looks like a very closed person.

17: 8 His outfit looks like it's on backward. I don't like the color. I've never been fond of the color red. It's not natural. I like browns and greens and earthy color like in the door and the bird.

17: 9 He's looking down. I don't like people who avoid eye contact.

17:10 I don't know what to say... you know what I really find strange is that you ask me to relax and then I wind up getting uptight trying to comment on this painting.

17:11 It's a stylized painting, not very realistic, stylized.

17:12 He has a strange mouth. It curves down and then curves up. He looks like he has an underbite rather than an overbite. But I like his jawline... I look at people's jawlines.

17:13 I notice the bird is sitting on a window. Hey. He's looking out a window.

17:14 I never have liked the color red. Red's sort of been a very harsh color. Not a very earthy color; I like earthy colors like brown, green, warm colors...

17:15 The painting doesn't strike me as being very warm. It's kind of cold; the person is cold, the colors are cold, the only thing that's warm is the bird down in the corner.

17:16 Strange they would have a branch sticking way into the room.

17:17 Who does he remind me of; he reminds me of somebody I know. A fellow who's an architect, but he's not cold, he's a nice person. He's in England right now. I'd like to be in England. Except I don't think he wears his clothes backwards like this gu

17:18 He's got a strange line in his forehead.

SUBJECT 18

18: 1 I see a clean man and he seems to be from an old Roman type...sort of era.

18: 2 He's got very striking features, frowning features on... his nose and face.

18: 3 He appears to be standing at a window looking outside at something outside.

18: 4 He's got a portrait of a bird down in the left hand corner.

18: 5 He's obviously been with someone, and he's followed him, cause he wants him in, cause there's an open door that he's just left open so both can come in and watch.

18: 6 Seems to be some kind of... judging from what I can see of his clothing, some kind of a religious man. I guess that's symbolised by the little white collar that you can see sitting around his neck still.

18: 7 Seems to be a very plain person as he has... although he has bright red, he's only wrapped with sort of brownish sleeves on it; so it seems to be relatively simple from what I can see of it.

18: 8 From what I can see of the surrounding wall, he's in an environment that seems to be rather stony and cold...

18: 9 so maybe he has some kind of... his personality is a cold... kind of personality; one that he wishes to break out of but which he can't and maybe that's why he's standing at the window.

18:10 That's the end of what I can see for right now.

18:11 Right now I... feel... I just feel hopeless, I can't think of anything else to say about the painting.

18:12 I'm at a loss, I don't know. I'm being a real test again. I guess I'm not concentrating on the painting, I seem to be wandering off and being more by myself instead of with the painting.

18:13 Going back to the painting again, I notice that it seems to be rather square, everything in it seems to be square... square doors, square walls, even the clothing he puts on him, square features, and square on his armbands there.

18:14 I can't figure out the significance of the bird in the corner...but it must have some kind of significance or else it wouldn't have been put down in the corner there hidden underneath his arm.

18:15 As a matter of fact as I look at the bird it's totally disproportionate to everything in the whole picture. It doesn't seem to belong at all. It's sort of a separate part of the painting.

18:16 Right now I'm trying to think of what kind of an artist would try and draw something like this or what his purpose in drawing the painting or painting the painting I should say.

18:17 Maybe he's trying to express the kind of inner feelings that he has, or maybe he's trying to show what kind of a person he really is, and trying to solve one of his own problems through his paintings.

18:18 Right now once again I've run out of ideas. I'm not communicating anymore, I'm not concentrating.

18:19 I'm starting to think more about four minutes that I'm supposed to be talking right now, so I'm just trying to fill it in instead of trying to look at the painting; so I look back at the painting again.

18:20 In the background of the picture it seems to have a nice light blue... a light blue which sits behind the doors, maybe it sort of means it's free and clear back there.

SUBJECT 19

19: 1 Well, my initial reaction is one of... sort of disdain because the basic expression on the individual's face that I'm seeing right now is sort of snobbish...

19: 2 or rather as I said before disdainful or looking down on people, especially because of the long pointed down nose; that's the first thing that hit me; and the slanted eyes and the sort of arrogant expression on his face.

19: 3 He looks like a nobleman of some sort. More than likely during the time of Machiavelli.

19: 4 He looks like he's probably passing judgement on somebody.

19: 5 There seems to be a bird; there is a bird as a matter of fact, in the lower left hand corner and it somehow seems to be sort of blended into his arm which is a rather fascinating way to paint this painting.

19: 6 It almost seems that the color of the bird does completely almost blend in with the color of the clothing that he's wearing which when you first look at the painting you almost completely ignore.

19: 7 It took me about five seconds to realise that there was actually a bird painted in the painting.

19: 8 There's an open door behind him which probably isn't too relevant.

19: 9 He's probably nobility judging from what he's wearing and again the expression on his face and the fact that he looks clean and more or less well kept.

19:10 Can't really think of anything to say right now.

19:11 Right now I'm feeling rather indifferent because... well it's not a particularly... no, actually it's a good painting...

19:12 but I feel rather indifferent because I'm not terribly attracted to people with that kind of attitude so I have sort of an instinctive feeling about... immediately I sort of react in a negative way to that kind of expression.

19:13 It is a great painting.

19:14 Obviously the shadows are really good. And the painting itself, I'd like to know about the person who painted that.

19:15 Did you say that I could ramble if I want ?

19:16 Good.

19:17 Isn't it disgusting when people say 'um' all the time ?

19:18 Well, he looks a little bit effeminate... you always... well I always do get that impression.

19:19 Probably perhaps say sixteenth century England maybe...

19:20 He wore this , sort of rather almost a smile on his face; it's not necessarily evil...

19:21 when you look at his eyes, the way the eyes were painted it's very hard to tell whether he's actually passing judgement or whether he's trying to be nice to somebody; it's very difficult to say.

19:22 He's definitely what he would be called in those times a gentleman of sorts I suppose.

19:23 Getting away from the background, the actual painting itself is... the shadows are very remarkable, around the chin and...

19:24 the forehead is a bit overdone. It's about the only bad thing I can say about the whole painting.

SUBJECT 20

20: 1 Well... it definitely would catch the eye.

20: 2 It's quite bizarre actually because it... well everything's so exaggerated in this picture; the man's face, all the features on his face seem to be so exaggerated.

20: 3 It's highly unattractive...initially...

20: 4 It appears he's... I think he's standing at a window frame and there's a bird sitting on the sill right I notice by him.

20: 5 It's not an unattractive picture actually. The colors seem more muted than the last one, they are, definitely the red frock is quite bright and the guy... your attention is drawn to that but the rest of the picture is really muted... or the color

20: 6 And... it's more pleasant I think, more pleasing with something like that... to back up, back it up.

20: 7 About the man himself, he's... his expression seems quite haughty perhaps a bit snobbish...

20: 8 and I think this painting must have been done perhaps in the early seventeen hundreds but...

20: 9 the artist, even though they do not catch perhaps perfect features of the face they caught the expression very well because he seems to be... each feature is radiating an expression of haughtiness, I think...

20:10 I'm a bit stuck right now...

20:11 Well I definitely like this picture this painting a great deal more than the last one ...

20:12 and I think perhaps it is because I can see more of the man's face, I see more expression than the last one; he seems to have some purpose... the characters in the other painting just radiated nothing.

20:13 Let's see... I can't quite figure out what the purpose of the bird is... It's funny the way, oh, the feathers are muted right into the sleeve of the man. Perhaps that has some bizarre symbolism but I don't think I could describe what it would be.

20:14 ...Right now I see...I think I'm getting more and more nervous as I get more and more stuck here...

20:15 ......It just occurs to me how greatly the styles of painting change because this painting was probably very very popular when it was done or within a recent era of when it was done but ...

20:16 today anything like this would be considered quite obsolete in the art world.

SUBJECT 21

21: 1 O.K. When I saw this painting all of a sudden, looked like the guy's head was on backwards. Looks like his shirt or his clothes should be turned round. Maybe that's just the way the suit is.

21: 2 I didn't like him when I first saw him. Guy looks pretty strange. I don't know something to do with his nose, eyes... looks a little bit...

21: 3 Looks different anyway.

21: 4 His hair doesn't look real, the guy doesn't look real the way he painted him.

21: 5 The next thing that I noticed, there's a bird in the corner sitting on a tree. He looks... well there's hard to see if it's more that the painter who painted him knew, I don't know.

21: 6 Next... for some reason there's shutters behind the guy. And they look...they don't look very real; the whole painting in general doesn't look real.

21: 7 Sort of got a cold feeling to it too.

21: 8 I guess that's pretty well all I can see in the painting.

21: 9 Except the red color in the middle shouldn't be there either. It doesn't suit the rest of the picture. It shouldn't have red in the middle, it should have all throughout the picture, it's coordinated.

21:10 And the tree branch too doesn't seem to be coming out of the tree, it's just coming out of the window.

21:11 Looks like almost a surrealistic painting.

21:12 O.K. I guess I'm finished now with that.

21:13 What I'm thinking right now is I'm wondering what this experiment's all about and why I have to tell my feelings about pictures... I don't know what that has to do with psychology, try to figure it out.

21:14 I guess... well the first thing you want when you're doing these experiments is why, what you're trying to find out. Usually expect something to happen.

21:15 ...I'm stuck.

21:16 I don't know, it's hard to talk about a painting for four minutes I guess.

21:17 Talk about the painting some more. I found some stuff...

21:18 I guess this would be about in the sixteenth, seventeenth century...

21:19 The guy is probably rich or famous because that's the only why they'd paint him.

21:20 There's still something about his face, looks... just doesn't look real... He's got a very strange face, his nose too long, his face is very long and thin...

21:21 I'm wondering why I'm talking about his face.

SUBJECT 22

22: 1 Well there's a little bird in the window.

22: 2 What a queer looking guy, all dressed in bright red clothes, I wonder why...

22: 3 Seems to be like a priest or something. But then I don't know...

22: 4 It's a very queer looking painting and it seems to be in Victorian times because the painting is square and it's proper and it seems to give a sort of a... primness to it.

22: 5 I don't know, guess I'm stuck.

22: 6 Part of his clothes, it's so soft; and the rest of it seems so hard... It's conflicting with each other...

22: 7 His face it gives him... well it does. Doesn't seem happy or sad, just seems like he's concentrating.

22: 8 The little... the blue sky, it's very subtle. I wonder why it comes in this painting.

22: 9 The blackness of his hair, it's the first thing you'd see in the painting.

22:10 I'm stuck.

22:11 He seem's to be so occupied.

22:12 ...I'm stuck again.

22:13 He seems to be... it looks like a portrait, sort of, because of the big wooden doors... I mean those are windows. And... there's sunshine coming into it.

22:14 He seems a little bit stuckup too because he has such a long nose.

22:15 Stuck again...

22:16 There must be a reason why that bird is in there. Probably contrasting moods; the bird is so happy and he is so sad but he doesn't look sad.

22:17 The painting seems monochromatic to me. There is basically one color here except for the contrasting black of his hair.

22:18 He sort of reminds me of Shakespeare a bit because of the facial form or whatever. He seems to be Victorian because of the way he's dressed and his hair and the house, if it's a house, or whatever.

22:19 He seems neat, clean, properly dressed.

22:20 Doesn't look like anybody I know.

22:21 There seems to be sort of a smirk on his face like he's mocking at something and...

22:22 then again the expression in his eyes seem very blank.

SUBJECT 23

23: 1 I think it's rather humorous, the expression on his face.

23: 2 The hairline, that's not realistic, it's unnatural.

23: 3 The nose is out of proportion.

23: 4 The bird seems to blend with his sleeve making his costume... the difference between the costume and the bird unrecognizable.

23: 5 It looks like his costume's on backwards.

23: 6 The landscape or scenery on the outside, there's none; it's very barren.

23: 7 He seems to be in deep thought. And by himself alone or perhaps being reprimanded by someone.

23: 8 ... the two eyebrows, one is different than the other; the one on my left hand side has a narrower brow than the one on the right hand side. Also the eyelid on the right hand side is very high compared to that on the left.

23: 9 It seems to be framed itself because of the architecture surrounding it.

23:10 ...I'm stuck now. It's rather difficult to do all this without having time to think about it like you do when you write it down.

23:11 ...The folds again and the creases in the costume depict depth.

23:12 Again the fiery red color appears with the again... with the mellow colors of the bird and the sleeves.

23:13 ......His mouth seems to depict as though he has some kind of smirk across his face although he's done some evil deed or something but yet his eyes look sorrowful.

23:14 The crease in his forehead makes it look as though his face could fold in half.

23:15 ...I would say it would be from the late Gothic period, perhaps not by one of the masters but...

23:16 ......The bird seems to associate him with nature in some sort of way with a mellow feeling of God's creation.

SUBJECT 24

24: 1 The first thing that catches my eye is the fellow's face. The profile is rather stiff. You notice the pointed nose, high forehead, stiff rigid chin.

24: 2 The smile, I don't know, could be arrogance could be just a pensive mood that he's in reflecting on something.

24: 3 The sparrow or whatever bird that is in the... in the corner seems to be part of his... whatever he's thinking of.

24: 4 The open window behind him could be significant.

24: 5 The clothing suggests that he might be a courtly figure... then again the face could, perhaps could suggest that slightly aristocratic... but then again it could be a sinister character... with the hooked nose, the eyes and they're narrowed...

24: 6 The bird and the character are both facing different directions but they seem to have; with the eyes of the bird and the whole face of the man, seem to have a different but yet the same sort of thought. It's not quite possible but the same feelin

24: 7 ...I like the camouflage of the bird in the cape.

24: 8 ...Strange what the twig would be doing in the left hand corner. Seems odd that it would be sitting on a window sill.

24: 9 Could be a self-portrait which is why it may look so ambiguous at times.

24:10 ...Right now I'm stuck. Can't...

24:11 ....

SUBJECT 25

25: 1 He looks like he's from the days of Romeo and Juliet... the Plantagenets or whatever they call themselves.

25: 2 Oh, there's a bird there.

25: 3 He looks like a member of a leading family in Shakespeare's days; he looks really stern and arrogant.

25: 4 I don't know what that bird is there for.

25: 5 Maybe he's a member of the clergy.

25: 6 He looks like someone I wouldn't like, he looks too arrogant.

25: 7 I can't talk for four minutes about this. I'm blocked already.

25: 8 Right now I'm thinking what's really behind this experiment.

25: 9 ...I'm blocked, I can't think of anything more to say.

25:10 ......Right now I wish this was over because I'm not enjoying it very much.

25:11 ....

SUBJECT 26

26: 1 O.K. First off, it doesn't seem to be a sensible painting, the guy's robe looks like it's on backwards; a bird standing there, a door, nothing seems to really be...to make much sense, it doesn't look too realistic.

26: 2 Somehow I think there's a lot of symbolism with the bird and that just sitting there.

26: 3 The color of the robe seems to be very striking, the significance of red I'm not quite sure what it is.

26: 4 The expression on the guy's face, looks like he's going to be sentenced or something like that.

26: 5 I keep thinking about the bird for some reason. What it has to do with the painting really. I just...

26: 6 I always try to... I think I try to read too much maybe into symbolism of these paintings but...

26: 7 Like right now I'm trying to think of tie-ins like with the bird and the color maybe. Or the open door and something in the background. I just sit and try and think about things like that.

26: 8 Right now I'm trying to piece some of these things together... but like I say the picture doesn't seem too organised in mental thought at least as far as I see the painting; I can't really...

26: 9 I think I've really lost interest in the painting... because I'm trying to piece things together but I really can't do it.

26:10 Seems to be almost a blockade for any more interest.

26:11 Paintings that I think I can figure out, you know, they kind of intrigue me but this one here I really can't make too much sense out of.

26:12 That's the mental block.

26:13 Right now I'm trying to look at the guy's expression on his face. I think facial expressions tell a lot about what a person's thinking or you know what the painting should be letting you think the person's thinking.

26:14 And... he's got an odd look on his face, almost a smugness and yet I don't know what it is really.

26:15 Again, these... I can't help it, these thoughts of the bird sitting there; I really can't figure it out, I think it really... It kind of bothers me when I try to think about what the bird's doing in the picture in regards to everything else.

26:16 The robe... it definitely looks like it's on backwards. I suppose that should have some significance, but I don't know what it is.

26:17 Kind of lost interest in the painting, I'm thinking about other things right now as I wish I could get to another picture that perhaps had more... maybe easier interpretations or something like that.

26:18 Actually... either the robe is on backwards or the guy's head is turned around.

26:19 Maybe it has something to do with going out of this, he's obviously inside a building because of the blueness being the sky; he's inside a building and maybe his head is turned around signifying that he refuses to go out into the open world.

APPENDIX 5. LISTING OF CONSTITUENT BINARY STRINGS

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SUBJECT      12345678911111111112222222
                      01234567890123456

CONSTITUENT

       1     11110101011101100111111110
       2     00111111111000100011000111
       3     00110101011101100101110110
       4     11000000111011010101010011
       5     00011111001110111010000000
       6     10111011010010011010000001
       7     00011101011001000010011000
       8     00101110000010010011001100
       9     10011100000000111101010000
      10     01111010100010000001000001
      11     11010101010000010000000101
      12     01010001010100010010001100
      13     00100000001101001110001000
      14     01101000001000000101010001
      15     00001110000000010011100010
      16     00000010001000111000101001
      17     00001101011000000010100100
      18     00000000001101100100110010
      19     00001000010000001011100010
      20     11010001000000100100100000
      21     01000011000000100100010010
      22     00000000111101000010100000
      23     00100000100100001001010001
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      25     00101000000010000100010001
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      35     00000100011000010000010000
      36     00000001000010010000001010
      37     00000000100001001000100001
      38     00000000001001001000100001
      39     00100100010000000100000001
      40     00100000000000011000000101
      41     10110000000010000000000001
      42     00010001000000010001000001
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44    00110010000001000000000100
45    10000100000010000011000000
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47    10100100000000010000001000
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127	01110011001100111011000010
128	11010100010011000110011101
129	00110011000100000000100001
130	00100000000100110110001111
131	01000001001000000000000001
132	00000100010001001000000000
133	10000101010000000111000000

APPENDIX 6. INSTRUCTIONS FOR EXPERIMENT II

Good day. Thank you for coming.

This experiment is concerned with aesthetic perception, how you experience works of art. To help set the tone for proper appreciation, I'm going to begin by giving you a short series of instructions designed to help you relax. To start, I would like you to get really comfortable, get as comfortable as possible, and relax to the best of your ability straight away....(5 sec)

Now I would like you to take in a deep breath, take in a full deep breath and hold it, and as you hold your breath in I want you to pay attention to the tension that accompanies the strain of holding your breath. In particular feel the tension throughout the chest and shoulders...(2 sec) Now breath out, and as you breath out notice how the tension disappears as you resume your normal pattern of breathing, notice how much more relaxed you feel as you breath normally and rhythmically...(5 sec)

Now I would again like you to create tension, this time by tensing every muscle in your body. Tense them tighter and tighter and feel the tension throughout the body. Hold that tension, hold it...(2 sec) Now relax, give up the tension, let your muscles become loose and let the warm pleasant sensation of relaxation envelope your body. Just give over to the beautiful feelings of relaxation....(15 sec). Good.

If one wishes to study responses to works of art, there are several possible ways to proceed. One possibility is to request that people actually describe, as best they can, the features of their experience of a particular work of art. This is not what I will be requesting you to do today, but nevertheless I would like to describe this process further now. Later I will want you to pay attention to your experience of a work of art as that experience occurs (though without reporting it). This is not as easy as it might sound. In fact, it is quite difficult to pay attention to the full range of responses that you may have while viewing a particular art work. The instructions which follow will be an attempt to illustrate to you many of the features of an experience of a particular work of art. In the next few moments, I will be showing you how one can describe the changes in their experience of a work of art while these changes occur.

To show you what I mean, let me demonstrate. Right now and in front of you is a copy of the same painting that I am looking at. In talking about my experience of this painting, there is an entire range of possibilities that I could mention. I may, while looking at the painting, describe my understanding of it. For example, I might say that this appears to be a portrait of a young woman, probably painted in the 16th or 17th century judging by the clothes.

I might also describe my feelings related to the painting. For example, I might say that I find the young woman quite pretty. In fact, the more I look at her the more attractive I find her to be. I feel that she was probably a very warm, pleasant individual to be with, when she was alive.

In addition to these reactions to the painting, I might describe some memories or associations that occur while I pay attention to the painting. For example, I might say that she reminds me of a girl that I met just the other day who was also a very warm, pleasant person, and that I felt that she was an ideal match for my friend who was taking her out.

Beyond these features, I might also talk about my reactions to structural aspects of the painting. For example, I might say that the figure in the painting seems to form a triangle against the dark background. There seems to be a lot of curves and smooth flowing lines in the painting. There's also a feeling of depth that I get from the puffy parts of her clothing. And the colors appear to be quite mellow; certainly not at all harsh.

Finally, I might even talk about my reactions to the task of paying attention to the painting. I might say, for example : Even while I reflect on this painting right now, I'm very aware that this is for the purpose of demonstrating it to someone else. I'm also aware right now that talking about this while I attend to it is hard to do.

Now: this range of responses is intended to be suggestive only. In focusing on your reactions to a particular painting, you may attend to this full range of possible reactions and any others that might occur to you.

Now before we go any further, let's do another brief relaxation excercise so that you'll be better able to concentrate on the painting. To begin with, tense all the muscles of your body, tense them tighter and tighter; hold that tension...(3 sec)

And now relax, let the muscles of your body become loose, and just enjoy the warm, pleasant feelings of relaxation. Let the feelings of relaxation spread right up the legs and into the buttocks and stomach. Feel it spread deep into the back and chest, and into the shoulders, and neck, and face. Just let the relaxation take over....(15 sec) Good.

What I would like you to do right now is pay attention, and continue to pay attention, to this particular painting. As you pay attention to the painting try to attend to your experience, think about whatever memories and associations, whatever feelings, whatever thoughts or fantasies, or whatever else that is part of your experience as you attend to the painting. After you have attended to the painting for a while, I will ask you to assist me further by answering some questions about your experiencing of the painting.

APPENDIX 7. CONSTITUENT QUESTIONNAIRE

Below are a number of statements that were given by others while viewing this painting. Please read these statements and indicate whether they express thoughts, feelings, or reactions that you had or felt while viewing the painting.

Please answer YES only if the statement accurately reflects your experience while you were viewing the painting. Do not answer YES if the statement appears true on reflection.

Answer YES only if you feel that the statement says what you might have said while viewing the painting, otherwise answer NO.

1. The man looks very aristocratic, very arrogant.
2. The clothing that he is wearing is odd.
3. It is strange that the sleeve blends into the bird's coat. You can't pick a point where the bird's feathers begin and the man's sleeve ends.
4. The person looks very closed.
5. The painter has shown good technique in painting the man's face.
6. One questions whether he is standing in front of a window or whether we are looking through a window at him; that is, whether the window is behind or in front of him.
7. I wonder where the man must be looking and what he must be thinking.
8. The colors are very well balanced.
9. I don't know what would possess anybody to paint a painting like this.
10. The man seems to know what he is doing; he looks very confident.
11. Maybe the man has done his duty and come in to report.

12. I don't really like this picture.
13. My eyes keep getting drawn to the robe he's wearing.
14. It seems to me that he refused to go somewhere or refused to do something.
15. The whole painting seems to focus on the man's face.
16. His body takes up most of the picture.
17. It seems strange that there would be a branch sticking way into the room.
18. I'm trying to piece things together; the picture doesn't give me an organized impression.
19. He reminds me of someone I know, a friend of mine.
20. The background is very dim; it's hard to pick out details.
21. He gives the impression of being a hard person.
22. The man doesn't seem to be looking at anything so he must be thinking about something.
23. The open window behind the man could be significant.
24. I'm trying to decide whether the painting symbolizes anything.
25. It seems to me that the man is in a very small place.
26. I don't know what to say about the painting; it's strange.
27. Maybe the bird is a symbol of something.
28. The painting contains a lot of contrast.
29. The perspective seems to keep shifting.
30. He appears to be standing in a window.
31. He has a big nose.
32. The painting is ugly.
33. The man looks like a lord.
34. I don't think it's a portrait of anybody in particular.
35. There's a nice texture to the painting. I feel like I could touch the red part of it.
36. The painter was probably trying to communicate something to the viewer of this painting.
37. The view we get is the artist's point of view, looking through a window.
38. He doesn't seem the kind of person who would have animals around him. The idea of a bird being that close to him just doesn't fit my image of him.
39. It looks like he's wearing his robe backwards.
40. I feel bored with the picture.
41. It's as if his glance were looking all the way down that long nose of his.
42. I'm interested in the perspective and in trying to figure out where things are placed.
43. This is a rather abstract painting.
44. I'm having trouble figuring out why the bird is in the painting.
45. It is a great painting.

46. A portrait would be a bit more flattering than this is.
47. There isn't very much to the picture.
48. It looks like a portrait that a person might want to have done of themselves if they wanted to project an image of power.
49. The figures are two dimensional in nature. They don't look quite proportional; they don't look right.
50. The first thing I noticed was the extremely bright red.
51. The man is not very handsome.
52. The painting invites you to try to determine what he's thinking.
53. It's probably a portrait of somebody.
54. From what I can see of the surrounding wall, he seems to be in an environment that is stony and cold.
55. The doorway seems to be extremely large.
56. There's something about him that seems a little bit deceptive.
57. I can't tell if it's a door or a window.
58. He seems to be standing in a doorway.
59. There is a lot of symbolism in the painting.
60. It took me a while to realise that there was actually a bird in the painting.
61. I think that he could be some type of an evil character.
62. He has a strange line in his forehead.
63. He leaves the door open as if he just came through.
64. It's like a priest's outfit that he is wearing.
65. He looks like he's passing judgement on somebody.
66. I wonder what the painter was like.
67. The painting strikes me because the face of the man doesn't look human.

APPENDIX 8. DEBRIEFING FOR EXPERIMENT 2

The experiment in which you have participated is concerned with the nature of your experience in response to art as part of a more global concern with the nature of internal experience in general. It is the hope of the experimenters to eventually develop a valid and reliable method of classifying people and experiences on the basis of freely chosen, spontaneous verbalizations. The present experiment takes a preliminary step in this direction by attempting to determine whether traditional and nontraditional questionnaire strategies can be of aid in this task.

Your questionnaire responses will be examined carefully to try to establish whether there are distinctive 'types' of experience common to people other than yourself. Your responses will be formed into a profile, and profiles from everyone who participates in this experiment will be analysed by a mathematical method called cluster analysis which will try to sort the profiles into groups that are similar to each other. For example, it may be that we will locate a group of persons who experienced the painting in a highly emotional manner and that this type of experiencing will be reflected in questionnaire responses. Once groups have been formed in this way, we will compare the characteristics of these groups to transcripts of people who were asked to verbalize about their experience of this painting in the hope that similarities will emerge between questionnaire responses and spontaneous verbal responses.

We hope it is now clear that no deception was involved in this experiment and that our motives were not hidden except insofar as they might prove disruptive of your spontaneous experiencing of the picture we presented to you. All information that we collected as a result of your participation in this experiment will be kept strictly confidential.

If you are interested in reading a research report that had an aim similar to this experiment, we invite you to ask for the folder labelled 'Stephan' at the Cameron Library Reserve Reading Room. That report attempts to discover distinctive types of experience elicited by Keats' famous poem 'Ode on a Grecian Urn'.

If you would be interested in receiving a summary of this research when it is completed, please leave your address.

I would be happy to answer any questions that you might have about this experiment at this time.

APPENDIX 9. QUESTIONNAIRE MEAN SCORES

QUESTIONNAIRE 1

	EXPERIMENT II		EXPERIMENT I	
	(N=110)		(N=26)	
VARIABLE	MEAN	STD. DEV.	MEAN	STD. DEV.
1	5.3182	1.9344	5.6154	2.0015
2	4.8000	1.9147	6.0000	1.9183
3	5.4091	2.1301	4.0000	1.6971
4	3.8182	1.5216	4.9615	1.8864
5	4.7909	2.4007	4.7308	2.6162
6	3.9273	1.9475	4.8462	1.7820
7	6.4636	1.9661	6.1923	2.1358
8	4.8364	2.1989	4.4231	2.4359
9	4.7273	1.9485	5.2308	2.2326
10	4.7909	2.1846	4.5769	2.2302
11	3.8909	1.6554	4.3077	1.9954
12	4.0000	1.8173	4.1923	1.7440
13	6.0636	2.0241	7.1538	1.4884
14	5.3273	1.9728	4.6923	2.5103
15	5.4909	2.1148	6.8077	2.0004
16	3.8716	2.2937	4.0769	1.5728
17	5.0273	2.3086	3.9615	2.6150
18	3.7727	1.7539	4.1538	1.4055
19	4.2818	1.7875	4.4615	1.6788
20	5.2455	2.0507	6.0385	1.7772
21	6.1927	2.0206	5.6154	1.8347
22	6.7339	1.9750	6.3462	1.8749
23	5.1364	2.0653	5.7308	2.3075
24	5.3636	1.8854	5.7308	1.9091
25	5.7727	1.8996	5.6538	1.7650
26	6.4273	1.5939	6.0385	1.8651
27	6.7182	1.7668	7.0385	2.1444
28	4.4909	2.7386	5.8846	2.1969
29	4.3761	2.5195	5.3846	2.4507
30	4.6636	2.1515	5.6923	2.1498
31	3.6000	2.5601	4.0769	2.5756
32	6.8545	1.8366	8.3077	.92819
33	4.5545	2.1228	5.0385	2.2178
34	3.6727	2.0369	3.5000	2.1024
35	5.3818	2.3225	6.0000	2.5140
36	3.4273	2.0653	3.7692	2.5816
37	2.1182	1.8510	2.8077	2.3155
38	3.5364	2.3332	4.9615	2.0877
39	3.4818	2.4857	5.0385	2.6904
40	4.0545	2.3689	5.4231	2.3353

41	4.6182	2.2867	5.6923	2.0932
42	6.2182	1.9972	6.8846	1.9458
43	4.5455	2.2773	5.1538	2.3612
44	3.6727	2.3738	5.1923	2.2982
45	4.7545	2.3273	6.1538	2.1483
46	4.2364	2.5048	5.5769	1.7927
47	4.4364	2.6250	5.0385	2.6455
48	2.3545	2.0879	3.1923	2.4661
49	3.8364	2.7041	4.0769	3.2115
50	5.3000	2.4290	6.3077	2.5103
51	5.6818	2.4000	6.8462	2.1296
52	3.5273	2.6221	3.8462	3.0423
53	5.9038	2.3873	6.4615	2.1210

QUESTIONNAIRE 2

VARIABLE	YES	NO
1	91	19
2	59	51
3	43	67
4	50	60
5	35	75
6	22	88
7	74	36
8	18	92
9	22	88
10	43	67
11	9	101
12	60	50
13	61	49
14	9	101
15	55	55
16	46	64
17	24	86
18	40	70
19	20	90
20	28	82
21	85	25
22	61	49
23	54	56
24	58	52
25	31	79
26	51	59
27	73	37
28	40	70
29	37	73
30	46	64
31	91	19

32	33	77
33	76	34
34	21	89
35	28	82
36	57	53
37	34	76
38	28	82
39	75	35
40	67	43
41	51	59
42	32	78
43	26	84
44	66	44
45	13	97
46	25	85
47	43	67
48	32	78
49	45	65
50	63	47
51	70	40
52	67	43
53	40	70
54	46	64
55	34	76
56	60	50
57	23	87
58	27	83
59	37	73
60	51	59
61	58	52
62	47	63
63	35	75
64	51	59
65	36	74
66	30	80
67	16	94

APPENDIX 10. FACTOR ANALYSIS OF STRUCTURED QUESTIONNAIRE

During a series of experiments reported by Berlyne (1975), subjects were shown a large series of paintings from different artists and different eras and asked to rate them on 12 bipolar scales. Berlyne isolated three factors from these scales which he called :

a. hedonic tone (including primarily items such as pleasing-displeasing, ugly-beautiful, comfort-discomfort).

b. arousal (including primarily items such as simple-complex, interesting-uninteresting, weak-powerful)

c. uncertainty (including primarily items such as clear-indefinite, balanced-unbalanced, simple-complex)

In another experiment, stylistic ratings of the same series of pictures resulted in four factors tentatively labelled by Berlyne as:

a. subjectivism (which emphasised the importance of the artist's emotions, perceptions and imagination in the production of the painting).

b. realism (which emphasized the importance of the quality of reproduction and deemphasised the importance of color)

c. classicism (which emphasised the importance of composition, lines and shapes).

d. impressionism (which emphasised the importance of surface and deemphasised the importance of line).

The author decided to use many of the scales used by Berlyne for Experiments I and II, augmented both by additional items that might be expected to relate to Berlyne's original factors and by items of interest in the context of these experiments. It was, therefore, the primary intention to derive an encompassing item pool beginning from the item pool provided by Berlyne, and was of secondary interest to examine relationships between the current questionnaire and those employed by Berlyne. Because the current experiment utilised only a single picture, it constitutes a severe test of the factors discovered by Berlyne and it was not expected that the stylistic factors in particular would be replicated.

Eighteen components (with eigenvalues greater than 1.0) accounting for 71.6 % of the total variance of the 53 questionnaire items were extracted using the prinicipal axes method from the responses for the 110 subjects of Experiment II together with the 26 subjects of Experiment I. The components were rotated to the Varimax criterion (Kaiser, 1958). Those items which loaded 0.30 or more on the resulting factors are reported below.[1]

LOADING	ITEM
FACTOR 1	
0.72	Color was important to my perception.

0.67	Light was important to my perception.
0.51	Composition (arrangement of elements) was important to my perception.
0.44	The painting was powerful (vs. weak).
0.34	I would like to study this painting at greater length.
0.32	Line was important to my perception.

FACTOR 2

0.74	My experience was interesting (vs. uninteresting).
0.70	My experience was positive (vs. negative).
-0.66	My experience was unsatisfying (vs. satisfying).
-0.65	The painting was ugly (vs. beautiful).
-0.57	My experience was depressing (vs. uplifting).
0.57	I would like to study this painting at greater length.
0.56	My experience was stimulating (vs. fatiguing).
0.44	The painting was warm (vs. cold).
-0.40	The painting was barren (vs. rich).
0.36	This experience has suggested new alternatives for exploring my response to art.
0.34	The painting was heavy (vs. light).
-0.33	The painting was simple (vs. complex).

FACTOR 3

0.79	I have experience with one or more forms of meditative discipline.
0.70	I engage in solitary self reflection.
0.59	I enjoy viewing art.
0.46	My dreams are typically very vivid, imaginative, and emotional.
0.37	Even now I can see the painting in my mind's eye.
0.36	My thoughts while viewing the painting occurred as thoughts (vs. images).

FACTOR 4

0.81	The painting was tense (vs. tranquil).
-0.61	The artist was concerned with harmony (vs. conflict).
-0.38	The painting was warm (vs. cold).

FACTOR 5

0.76	I became so involved in the painting that I forgot myself and my surroundings.
0.71	At this moment, I feel more aware of myself than is usual.

0.69	I felt the "distance" between myself and the painting closing as I continued to view it.
0.42	This experience has suggested new alternatives for exploring my response to art.
0.38	I experienced clear shifts in feeling or discontinuities in experience.
0.31	The painting was clear (vs. indefinite).

FACTOR 6

0.71	The painting was balanced (vs. unbalanced).
-0.66	The painting was disorderly (vs. orderly).
0.60	The painting was realisitic (vs. unrealistic).
0.44	The painting was clear (vs. indefinite).
0.31	My experience with the painting was similar to other experiences I have had with paintings or works of art.

FACTOR 7

0.76	I felt that it was difficult to arrive at a well-articulated and definite impression of the painting.
-0.70	My experiences were clear and definite (vs. fuzzy and confused).
-0.63	I have a well-formed impression of this painting.
0.42	Viewing the painting was an emotionally draining experience.
-0.32	Viewing the painting helped me clarify one (or more) of my personal concerns.
-0.30	I feel that words can adequately capture the experiences that I had with the painting.

FACTOR 8

0.67	Viewing the painting helped me clarify one (or more) of my personal concerns.
0.65	Viewing the painting was an emotionally draining experience.
0.42	I found myself worrying about how well I was doing while viewing the painting.
-0.34	My experience with the painting was similar to other experiences I have had with paintings or works of art.
0.35	My experience was depressing (vs. uplifting).

FACTOR 9

0.77	The artist was concerned with objective ideas (vs. inner feelings).

0.37	The artist was concerned with harmony (vs. conflict).
0.34	My thoughts while viewing the painting occurred as thoughts (vs. images).
-0.34	My experience was stimulating (vs. fatiguing).

FACTOR 10

0.77	My experience was pale (vs. colorful).
0.61	The painting was ugly (vs. beautiful).
0.57	The painting was barren (vs. rich).
-0.47	The painting was clear (vs. indefinite).
0.37	My experience with the painting was similar to other experiences I have had with paintings or works of art.

FACTOR 11

0.75	I tried to be as precise and systematic as possible while experiencing the painting.
0.54	I feel that words can adequately capture the experiences that I had with the painting.
0.52	I found myself worrying about how well I was doing while viewing the painting.
0.36	My thoughts while viewing the painting occurred as thoughts (vs. images).
0.34	Even now I can see the painting in my mind's eye.

FACTOR 12

0.77	I like to draw and/or paint.
0.73	My education has included training in art history and appreciation.
0.47	I enjoy viewing art.

FACTOR 13

0.61	The painting was simple (vs. complex).
0.60	I can recall my experiences while viewing the painting vividly.
0.35	My dreams are typically very vivid, imaginative, and emotional.

FACTOR 14

0.85	My impression of the artist's fantasies or imagination was important.
0.79	My impression of the artist's feelings or emotions was important.

0.36	I feel that words can adequately capture the experiences that I had with the painting.

FACTOR 15

0.82	The painting was realisitic (vs. unrealistic).

FACTOR 16

0.80	Shape was important to my perception.
0.78	Line was important to my perception.

FACTOR 17

-0.78	The painting was heavy (vs. light).
-0.44	The painting was powerful (vs. weak).
0.32	Even now I can see the painting in my mind's eye.

FACTOR 18

0.77	The painting was curved (vs. angular).
-0.52	My thoughts while viewing the painting occurred as thoughts (vs. images).

The substantive interpretation of these factors is straightforward and the structure contains few surprises. In particular, factor 6 replicates the factor labelled 'uncertainty', factor 14 replicates the factor labelled 'subjectivism' and factor 1 marginally replicates the factor 'classicism' in the experiments of Berlyne (1975). In addition, the factors 'hedonic tone' and 'arousal' appear together in factor 2, and the splinter factor 15 bears content ressemblance to Berlyne's 'realism'. The current study also produces additional factors that ressemble aspects of the Berlyne factors including factor 4 which includes aspects of 'arousal' and factor 7 which includes aspects of 'uncertainty'.

A full analysis of the Berlyne factors would require experiences with several paintings within a single session to avoid the possibility that particular paintings do not reflect general relationships between factors, and to more adequately sample artistic styles.

FOOTNOTE

[1] It should be noted that this strategy of reducing the available information from the subject responses to the 53 item questionnaire eliminates many alternative forms of analysis of this data set including the clustering of cases and the subsequent assignment of subjects from Experiment I to clusters derived from Experiment II.

It should also be noted that the form of factor analysis chosen was a decision made in the face of violent disagreements within the field (for example, see Schonemann & Steiger, 1976; McDonald & Mulaik, 1980). The choice was based upon the use of factor scores in Experiment I, and upon the fact that no inferences from the sample to a population were attempted. In assessing the degree of convergence between the analysis of the current questionnaire, and the factors derived by Berlyne (1975), it should be kept in mind that alternate factor strategies have not been attempted.

APPENDIX 11. OVERLAPPING CLUSTERS OF CONSTITUENT ITEMS

Because of a ~~strong~~ belief that the data matrix derived from the constituent questionnaire possessed structure that was not adequately represented by traditional methods, a further form of analysis was explored. It was reasoned that a potential explanation for this failure was that once an object has been placed in a cluster, it is not free to be placed into additional clusters.

A method which the author calls 'Maximal Subgroup Complete Linkage Clustering' was designed. This method searches the entire similarity matrix for items that would be placed together in a Complete Linkage clustering at a particular criterion level, without eliminating any item from consideration because of its presence in any other cluster. [1] Because of the difficulties involved in intepreting overlapping clusters of subjects, the method was applied experimentally to the similarity matrix of the 67 items of the constituent questionnaire. [2] Similarity was calculated as the phi-over-phimax correlation coefficient and a criterion of 0.30 was employed. For purposes of representation of the resulting data, the familiar Venn diagram was employed as follows :

a. For each group of three or more items that emerged from the analysis, a circle was drawn which encompassed these items.

b. Each item in the initial circle was considered in turn, and Venn representations were added when the item appeared in a new configuration which included additional items.

c. An overlapping cluster group was pragmatically defined as a group of items showing considerable mutual overlap in the resulting Venn representation, and few points of contact with other overlapping cluster groups. In particular, groups linked by the mutuality of a single item were separated. [3]

Six overlapping cluster groups comprising 6 or more items were isolated, and a large number which comprised fewer items were also isolated. The complexity of this data precludes its full presentation here. Table 11-I shows four of these item groups. Table 11-II shows a two-dimensional minimum space analysis (Lingoes, 1965) for the phi-over-phimax intercorrelations of the items of group 1. Table 11-III shows a two-dimensional scaling of the items of group 2.

For interpretive purposes, the Venn diagram representation was superimposed on these two-dimensional spaces and the assent frequencies for the items were examined closely. [4]

For the items of Group 1, The space appears to be divided into three quadrants:

d. The first contains the items 25,15,48,24 and 20 which are loosely connected. The two highest frequency items 15 and 24 are associated with

TABLE 11-I OVERLAPPING CLUSTER GROUPS

ITEM GROUP 1

1. The man looks very aristocratic, very arrogant.
10. The man seems to know what he is doing; he looks very confident.
15. The whole painting seems to focus on the man's face.
20. The background is very dim; it's hard to pick out details.
24. I'm trying to decide whether the painting symbolizes anything.
25. It seems to me that the man is in a very small place.
31. He has a big nose.
33. The man looks like a lord.
41. It's as if his glance were looking all the way down that long nose of his.
48. It looks like a portrait that a person might want to have done of themselves if they wanted to project an image of power.
56. There's something about him that seems a little bit deceptive.
61. I think that he could be some type of an evil character.
65. He looks like he's passing judgement on somebody.
67. The painting strikes me because the face of the man doesn't look human.

OVERLAPPING CLUSTERS

```
 1 41 65
   41 65 31 48
         31 48 56
            48    24 15
            48    24    20
                  24 15    25
 1    65                      33 61
 1                            33    10
      65                      33 61    67
      65       56             33 61
```

ITEM GROUP 2

9. I don't know what would possess anybody to paint a painting like this.
12. I don't really like this picture.
21. He gives the impression of being a hard person.
26. I don't know what to say about the painting; it's

strange.
32. The painting is ugly.
38. He doesn't seem the kind of person who would have animals around him. The idea of a bird being that close to him just doesn't fit my image of him.
40. I feel bored with the picture.
46. A portrait would be a bit more flattering than this is.
47. There isn't very much to the picture.
49. The figures are two dimensional in nature. They don't look quite proportional; they don't look right.
51. The man is not very handsome.
67. The painting strikes me because the face of the man doesn't look human.

OVERLAPPING CLUSTERS

```
 9 12 32 40 46
 9 12 32 40    26
   12 32 40 46 26 21
   12 32 40    26    47
   12 32 40          47 67
   12       46 26          49
      32 40    26 21
      32 40       21 47
            46    21          38 51
```

ITEM GROUP 3

7. I wonder where the man must be looking and what he must be thinking.
36. The painter was probably trying to communicate something to the viewer of this painting.
45. It is a great painting.
52. The painting invites you to try to determine what he's thinking.
59. There is a lot of symbolism in the painting.
63. He leaves the door open as if he just came through.

OVERLAPPING CLUSTERS

```
 7 36 45 52 63
 7 36 45       59
```

ITEM GROUP 4

3. It is strange that the sleeve blends into the bird's

coat. You can't pick a point where the bird's feathers begin and the man's sleeve ends.
13. My eyes keep getting drawn to the robe he's wearing.
17. It seems strange that there would be a branch sticking way into the room.
27. Maybe the bird is a symbol of something.
44. I'm having trouble figuring out why the bird is in the painting.
59. There is a lot of symbolism in the painting.

OVERLAPPING CLUSTERS

3	13	17	44		
3		17	44	27	
3			44	27	59

TABLE 12-II SCALING OF ITEM GROUP 1

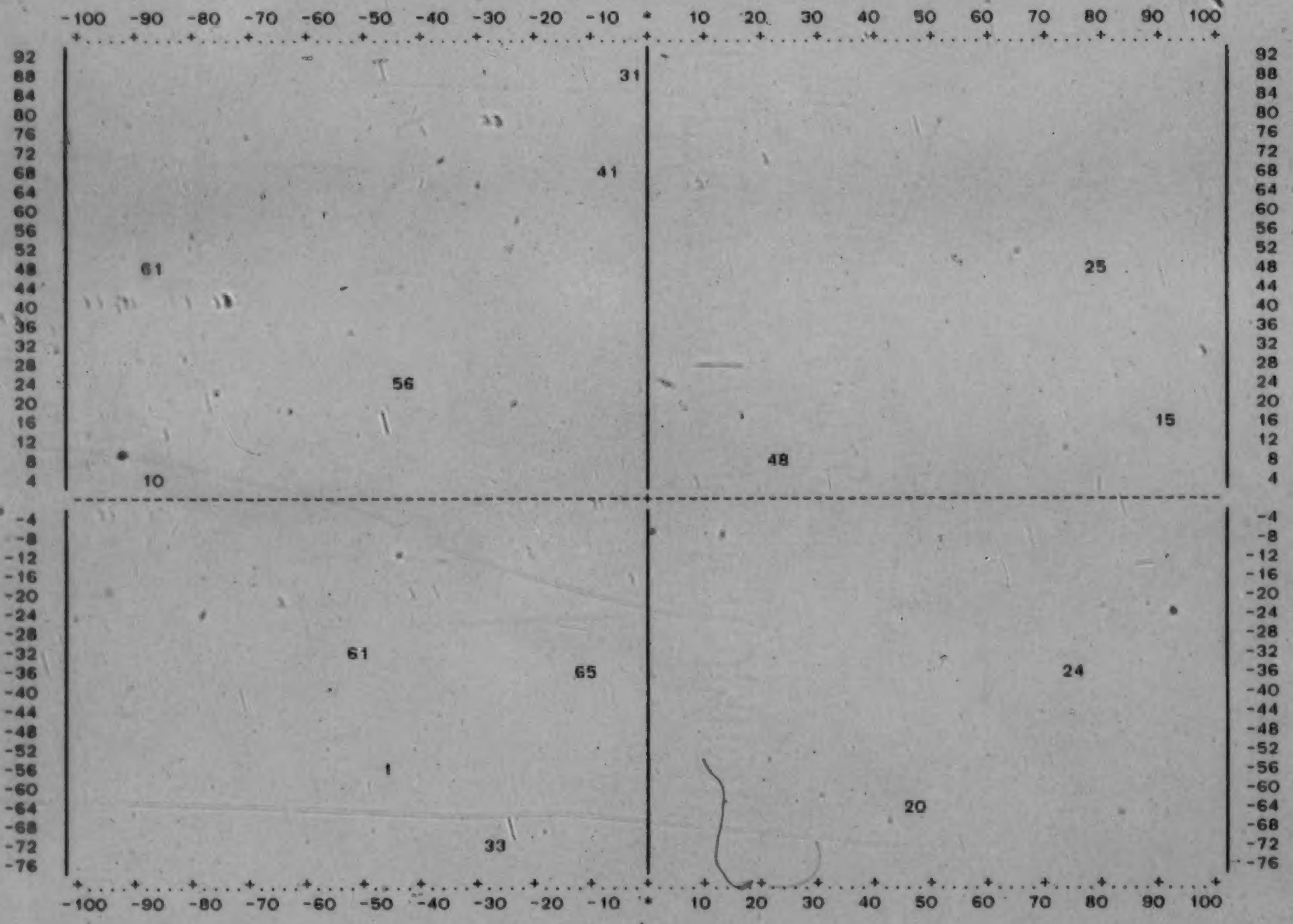
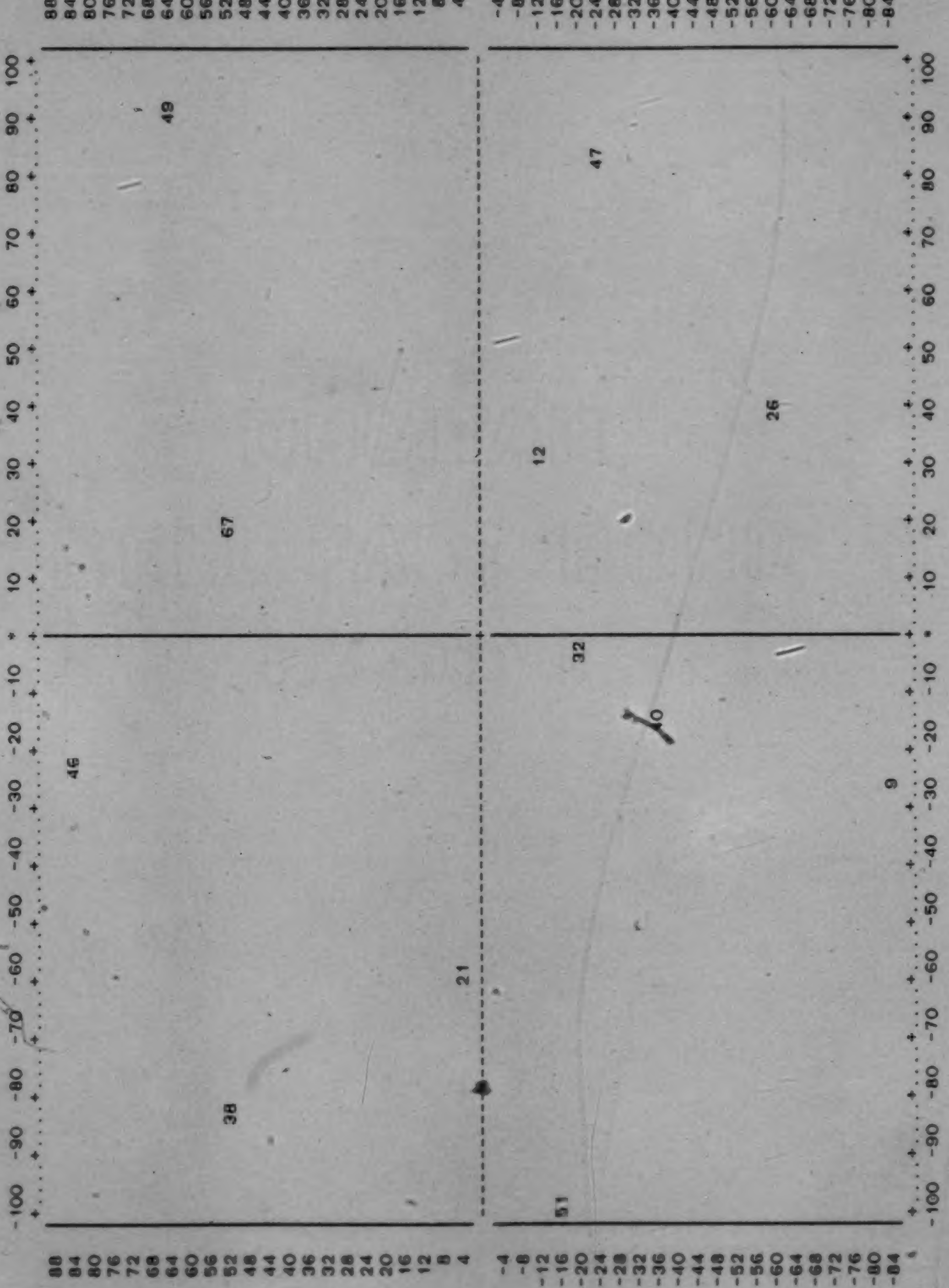


TABLE 12-III SCALING OF ITEM GROUP 2



multiple subgroups depending on the responses that particular individuals give to the low frequency items 20,25 and 48. The five items share a common strand of meaning connected to the centrality of the figure in the painting, and perceptual and interpretive observations consistent with it.

e. The second contains the core group of items 1,33,61, and 65 which are connected by their concern for the expression and arrogant bearing of the figure and reasons that might explain it. Assent to item 10 which is a moderately frequent item is associated with items 1 and 33 and not items 61 and 65 suggesting that there is a negative evaluative and an unevaluative manner of approaching the bearing of the figure in the painting. The relationship of item 67 (to items 61,65, and 33 but not to item 1) suggests that the figure (consistent with his bearing) can be seen as more or as less realistic. Similarly, the relationship of item 56 (to items 61,65,and 33 but not 1) suggests that the interpretation can be tinged with uncertainty.

f. The third subgroup of items (41 and 31 with various overlaps to the other groups) shows a preoccupation with the fact that the nose of the figure stands out and in conjunction with other overlapping items, interpretations of this perception (including deception(56), arrogance(1), judgement(65), or power(48)).

Overall, the items of group one can be characterised as concerned with the appearance of the figure, his expression and bearing, and possible explanations of it.

The picture for group 2 is more complex :

a. The core group of items (12,32,26,40) betray a negative evaluation of the painting and perhaps an inability to know how to react to it. Various other items are associated to this group in various subgroupings: item 9 reflecting on the artist's motivation, item 47 commenting on the barrenness of the painting, and item 67 expanding on the strangeness of the painting.

b. Another cluster containing items 38,51,21,and 46, which reflects a negative evaluation of the appearance of the man rather than the painting, has points of overlap with the first cluster particularly at the high frequency item 21.

c. Items 67 and 49 seem strangely placed in relation to each other since they are not associated. In addition, item 49 which shares a subgroup with 26 and 46 (seeming to reflect an inquiring attitude into the reasons for the painting's strangeness) would seem to be misplaced. This reflects upon the adequacy of the two dimensional solution to represent the relationships in the data (at least those of a positive sign)

Overall, this item group explores the (sometimes) complementary aspects of a negative evaluation and the concept of strangeness. It is considerably more cohesive than the items of group 1 as indicated most dramatically by an examination of the classification arrays of Table 11-I.

The items of group 3 fall into two clusterings (items 7,36,45,52,63) and items(7,36,45, 59). The items of the group in total reflect an interpretative attitude to the painting sometimes with a positive evaluative one. The first set of items focuses on the possibility that the painting has an interpretation consistent with the short term time frame of the representation, while the second set focuses upon the potential symbolic aspects of an interpretation.

The fourth group of items (3,13,17,27,44,59) focuses primarily upon the role of the bird in the painting. Thus items 3,27,44,59 focus primarily upon the interpretive and symbolic aspects of the presence of the bird; while items 3,13,17 and 44 focus more upon the perceptual ambiguities that surround the bird's presence (perhaps in relation to similar ambiguities entertained about the man).

The variable groups from Experiment I (Appendix 7) do not have strong parallels to the overlapping clusters of Experiment II. A number of the items of item group 2 are consistent with the variables of variable group 2 from Experiment I; even to the cooccurrence of the negative evaluation and the concept of strangeness but without the strong association with the interpretation of the painting as a portrait. There is also a similarity between item group 4 and variable group 10 from Experiment I. As well, the subjects from cluster 4 in Experiment I appear to share the variables of item group 4, the subjects of cluster 5 appear to share the items of item group 1 related to centrality and some item group 2 items, and the subjects of cluster 6 share many of the items of item group 2. The comparison does point out however that the item pool for the 67 item questionnaire seems to have inadequately represented several areas that were of clear concern to the subjects of Experiment I including uncertainty, multiple interpretations, becoming stuck, concern with contrast, and detailed technical appraisal. All possibilities for the comparison of data from the two studies has not been exhausted. At least two approaches seem possible :

a. the application of overlapping cluster methods to the subject data from Experiment II.

b. the formation of nonoverlapping variable groups by the exclusion of certain items found to be highly overlapping and a subsequent clustering of subjects using these composites.

FOOTNOTES

1 The algorithm is as follows :

- a. Input a suitable similarity matrix and a suitable criterion below which no items will ever be placed together.
- b. Calculate a matrix of nearest neighbours for each point such that each row contains the designation of a point which exceeds the similarity criterion with the variable designated by the row. (This matrix represents the maximal subgroup clustering of the matrix where each group contains 2 members.)
- c. In turn, consider each pair of points as contained in a particular row of the nearest neighbor matrix.
    - 1) Include a point in the current cluster if it is contained in the rows of the nearest neighbor matrix for all current members of the cluster. (This is a recursive process, and can be programmed to any depth. The current implementation considers only groups to a maximum size of 5. Any group of larger size will be recognisable in the final solution because it will appear as two groups of 5 members differing by only a single member.)
    - 2) Enter in a check matrix a designation to prevent the reconsideration of pairs of items that have already been considered.
    - 3) When no more members can be added to the current cluster, output the cluster member classification array.
- d. Consider every remaining pair of items in the row in the same manner.
- e. Repeat the procedure for every row of the nearest neighbor matrix, eliminating from consideration every pair of points that has previously been considered as a pair.

This algorithm has been programmed as MAXSUB by the author and is contained in appendix 12.

The program could be alterred to include the following:

- a. consideration of maximal subgroups at varying levels of the similarity criterion.
- b. adaptation for use with other cluster amalgamation rules (although in those cases, if the amalgamation rule is complex to calculate, or if the similarity of the current cluster to remaining points changes with the inclusion of a point; the calculations may become prohibitive).

Care must be excercised in the choice of a similarity criterion to avoid excessive output, especially in the case that the data shows strong relationships.

The principal computational advantage that this method has over other published methods of overlapping clustering (Jardine & Sibson, 1968; Shepard & Arabie, 1979; Arabie & Carroll, 1980) is that it easily allows for the clustering of very large data matrices. These alternate methods do, however, have a firm mathematical and theoretical basis, where the current method is principally pragmatic.

2 In addition, with binary data the existence of clusters of variables implies the existence of clusters of subjects.

3 This form of representation can be considered as a two dimensional scaling procedure which operates on a very restricted portion of the available similarity data. Two possibities are :

a. to attempt to maintain constant distances between the item points that are included in the same cluster
b. to attempt to represent the distances between items included in each cluster in proportion to their similarity coefficients

The attempt to maintain distances between points not included in the same cluster would result in a multidimensional scaling (Kruskal, 1964). This basis for formation of the Venn diagrams allows another method of separating overlapping cluster groups:

> when the representation can no longer allow the distances to be maintained in either of the ways suggested above, the representation has been shown to be inadequate in two dimensions.

4 Because the analysis had proceeded with measures of similarity that had had a 'correction' for differing frequencies applied, substantive interpretations need consider the frequencies of assent associated with the items. Assumptions underlying the interpretations are:

a. that high frequency items can be assented to for a wide variety of reasons (that is, they have a wide range of application and can encompass a wide variety of different experiences)
b. that low frequency items represent a far more restricted range of application to experience.
c. that shared variance between a low frequency item and a high frequency item indicates the direction of focus of the experience that the individual was indicating when he assented to the high frequency item.

APPENDIX 12. COMPUTER PROGRAM LISTINGS

PREPARE

```
# prepare transcript file for analysis

implicit integer (a-z)
dimension data(4,80)
dimension line(248)
common line(248),data(4,80)
data mins/'-'/
data eof/'/'/
data new/'<'/
subj=1
sequ=0

repeat {
call blankk     #blank out the array
do(j=1,4) {
  nchar=0         # no characters yet in this molecule
  read(5,2)(data(j,k),k=1,80)
  if(data(j,1)==eof|data(j,1)==mins|data(j,1)==new){
    # then this to go and previous to be printed
    call press(j,nchar)
    sequ=sequ+1    #next molecule in sequence
    call print(subj,sequ,nchar)
    if(data(j,1)==eof) go to 99   #exit
    if(data(j,1)==mins) {
      subj=subj + 1    # a new subject's data
      sequ=0
      }
    break   #begin to get data again
    }
  }
}

99 continue
2 format(80a1)
return
end

subroutine blankk
implicit integer (a-z)
common line(248),data(4,80)
data blank/' '/
do(j=1,248)line(j)=blank
do(j=1,80)do(k=1,4)data(k,j)=blank
return
end
```

```
subroutine press(j,nchar)
implicit integer (a-z)
common line(248),data(4,80)
data blank/' '/
nchar=0
j=j-1   #because the last line is to be excluded
do(k=1,j) {
  do(l=1,80){
    l1=l+1
    l2=l+2
  if(data(k,l)¬=blank&data(k,l1)¬=blank& !
     data(k,l2)¬=blank){
      nchar=nchar+1
      line(nchar)=data(k,l)
      }
  }
}
return
end

subroutine print(subj,sequ,nchar)
implicit integer (a-z)
common line(248),data(4,80)
write(6,1) subj,sequ,(line(j),j=1,nchar)
1 format(i2,':',i2,2x,248a1)
return
end
```

DISPLAY

```
# display constituents

implicit integer (a-z)
dimension data(255)
data mins/'-'/
data eof/'/'/
data blank/' '/
data star/'*'/

1 continue

read(5,2,end=99)(data(j),j=1,255)
if(data(1)==eof) go to 99

if(data(1)==mins | data(1)==star ) {
  write(6,3)(data(j),j=1,100)
  go to 1
  }
j=0
repeat {
  j=j+1
  k=j+1
  l=k+1
  m=l+1
  }
  until((data(j)==blank&data(k)==blank&data(l)==blank&!
        data(m)==blank) | j==255)
stop=j

write(6,4)(data(jk),jk=1,5)
index2=5
repeat {
  index1=index2+1
  index2=index1+40
  if(index2>stop)index2=stop
  repeat {
    index2=index2+1
    }
    until (data(index2)==blank | index2==index1+55 |   !
           index2>=stop)
  write(6,5) (data(jk),jk=index1,index2)
  }
  until (index2>=stop)
  go to 1


 99 continue

2 format(255a1)
3 format('1',5x,50a1/5x,50a1/)
4 format('0',5x,5a1)
5 format(' ',3x,55a1)

return
end
```

WORDCOUNT

```
* word count (see p.122 Snobol4 Manual)
*
 &ANCHOR = 1
 &MAXLNGTH = 255
 INPUT('INPUT',5,'')
 OUTPUT('OUTPUT',6,'')
 SEPARATOR = ' .,;:?!-0123456789'
 END = BREAK(SEPARATOR)
 GAP = SPAN(SEPARATOR)
 TOKEN = END . WORD GAP
 COUNT = TABLE(500,50)
READ LINE = INPUT       :F(PRINT)
 LINE = REPLACE(LINE,'abcdefghijklmnopqrstuvwxyz',
.'ABCDEFGHIJKLMNOPQRSTUVWXYZ')
 LINE GAP =
NEXTT LINE TOKEN =                        :F(READ)
```

```
 COUNT<WORD> = COUNT<WORD> + 1              :(NEXTT)
PRINT COUNT = CONVERT(COUNT,'ARRAY')        :F(END)
 I = 1
NEXTC OUTPUT = COUNT<I,1> '=' COUNT<I,2>      :F(END)
 I = I + 1                                    :(NEXTC)
END
```

LOOK.PART

```
# take in partition - output ordered constituent list

implicit integer (a-z)

dimension data(26,133),title(133,25)
dimension freq(133),clfreq(133)
dimension clmemb(13),cltit(25),tab(133)
real perc(133)

call setlio('4        ', !
          'spne:simplecons+spne:compoundcons ')

do(j=1,133) {
 read(4,(i1,1x,25i1,25a4))(data(i,j),i=1,26),  !
     (title(j,k),k=1,25)
  freq(j)=0
  do(k=1,26) {
    freq(j)=freq(j)+data(k,j)
    }
 }

repeat {
#                read in cluster members and title

  read(5,(13i2,25a4),end=999)   !
    (clmemb(i),i=1,13),(cltit(i),i=1,25)

  write(6,('1     ',25a4))(cltit(i),i=1,25)
     #write out title

  do(kk=1,133)clfreq(kk)=0

  do(i=1,13) {
    index=clmemb(i)
    tot=i
    if(index==0)break
    do(j=1,133) {
      clfreq(j)=clfreq(j)+data(index,j)
      }
  }

  do(j=1,133) {
    perc(j)=(float(clfreq(j))/float(tot-1))/ !
```

```
                 (float(freq(j))/26.0)
    }

  do(j=1,133)tab(j)=0
  do(jj=1,133){
    max=-2
    do(j=1,133){
      if(clfreq(j)>max & tab(j)>-1) {
        max=clfreq(j)
        ind=j
        }
      }
    tab(ind)=-2
    write(6,(i5,f10.2,5x,25a4))clfreq(ind),perc(ind),  !
           (title(ind,kl),kl=1,25)
    }
}
999 return
end
```

LOOK.VGROUP

```
# take in variable group and output names

implicit integer (a-z)
dimension title(133,25) ,clmemb(40)
call setlio('4        ', !
          'spne:simplecons+spne:compoundcons ')

do(j=1,133) {
 read(4,(27x,25a4))(title(j,k),k=1,25)
 }
repeat {
  read(5,(40i3),end=999)(clmemb(i),i=1,40)
  write(6,('1      VARIABLE GROUP'/))
  do(i=1,40) {
    index=clmemb(i)
    if(index==0)break
    write(6,(5x,i5,25a4))index,(title(index,lk),lk=1,25)
  }
}
999 return
end
```

MAXSUB

```
define(NT,67)
define(CRIT,0.30)
define(MAXNUM,50)

```

```
dimension sim(NT,NT)
integer check(NT,NT),stack(MAXNUM)
integer this,three,four,five
do(j=1,NT)do(k=1,NT)check(j,k)=0

# read in similarity matrix in lower triangular form
do(i=2,NT){
 read(5,(67F5.2))(sim(i,1),1=1,NT)
 }
sim(1,1)=0.0
do(i=1,NT)do(j=i,NT)sim(i,j)=sim(j,i)

do(i=1,NT) {        # looping over all variables



          #first find K-list
 n=0
 do(j=1,MAXNUM)stack(j)=0
 do(j=1,NT) {
  if(sim(i,j)>CRIT) {
    n=n+1
    stack(n)=j
    }
  if(n>(MAXNUM-1))break
  }
  if(n==0)next

         #print out K-list
write(6,(' Variable ',i3,' meets crit with ',30i3))  !
        i,(stack(j),j=1,n)

         #look for threes (and fours if possible)
 for(m=1;stack(m)¬=0;m=m+1) {
  this=stack(m)
  if(check(i,this)>0 | check(this,i)>0)next
   check(i,this)=1 ; check(this,i)=1

   for(mn=m+1;stack(mn)¬=0;mn=mn+1) {
    three=stack(mn)
    if(sim(this,three)>CRIT) {
      write(6,98)i,this,three,sim(i,this),  !
         sim(i,three),sim(this,three)
98 format(' G= ',3i3,3x,3f5.2)

        for(mno=mn+1;stack(mno)¬=0;mno=mno+1) {
         four=stack(mno)
         if(sim(this,four)>crit&sim(three,four)>crit){
          write(6,97)i,this,three,four, !
             sim(i,this),sim(i,three), !
             sim(i,four),sim(this,three), !
             sim(this,four),sim(three,four)
97 format(' G= ',4i4,3x/5x,3f5.2/10x,2f5.2/15x,f5.2)

```

```
          for(mnop=mno;stack(mnop)¬=0;mnop=mnop+1) {
            five=stack(mnop)
            if(sim(this,five)>crit &    !
               sim(three,five)>crit &    !
               sim(four,five)>crit) {
               write(6,96)i,this,three,four,five, !
sim(i,this),sim(i,three),sim(i,four),sim(i,five), !
sim(this,three),sim(this,four),  !
sim(this,five),sim(three,four), !
sim(three,five),sim(four,five)
96 format(' G= ',5i3/5x,4f5.2/10x,3f5.2/15x,2f5.2/  !
         20x,f5.2)
               }
            }
         }
        }
      }
     }
    }
   }      #and so ends the recursion
return
end
```